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ABSTRACT

This curriculum guide offers guidelines for structuring a course which exposes the students to various environmental careers. The guide is divided into three sections. The first section offers information about such a course: course description, purpose, credits, special or unique aspects, physical facilities, equipment, major materials, teacher certification, and evaluation. Section two includes 26 teaching units such as ecological systems, construction for outdoor recreation, camp management operation, and air in the environment. Each unit contains a work sheet with unit title, unit objectives, teaching sequence, unit length, prerequisites, evaluation, instruction materials, and general comments. The unit guidelines include the title of the unit, teaching objectives, content, suggested teaching-learning experiences, suggested evaluation methods, and suggested resource materials. The third section contains six appendices: Sources of Additional Reference Materials, Regional Listing of Natural and Man-Made Environmental Locations in North Carolina, Films and Visual Materials, Environmental Yearbooks, Suggestions and Procedures in Developing Nature Trails, and Suggestions and Procedures for Developing Teaching-Learning Stations. (TK)

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PREFACE

Mushrooming public concern over environmental quality has resulted in increased activity in the treatment of our natural resources. This increased activity is giving rise to new manpower needs and a reordering of functions in the work of those now engaged in occupations involving our natural resources. Experts in manpower needs in the environmental control area agree that the emphasis is too new to identify specific job classifications at the present. Instead, they believe the jobs fall into broad classifications of work that may be understood in many environmental areas.[1]

The broad classifications of work in the environmental area, the projected manpower needs, and the expectations of those in each classification are summarized in Table I and Table II, (see following pages).

These data do not apply specifically to "outdoor recreation and applied ecology". However, there is enough information to suggest that growth in this area will occur and what workers likely will be doing. The teacher of agriculture is already familiar with many of those working in natural resource occupations. The point is that the work of people in these occupations is changing from strictly a production orientation to an urban, recreational and people centered orientation.

The user of the guide will need to develop a local program in Outdoor Recreation and Applied Ecology that is most appropriate to the school area. Teaching units in the guide have been organized into three parts:

Part I	Recommended Units Where Course is Offered
Part II	Optional Units
Part III	Environmental Subject Units

Admittedly, much remains to be done in developing our "Outdoor Recreation and Applied Ecology" teaching units. Those who prepared this guide believe strongly that "pilot" programs and a continuous curriculum development effort will be necessary if this area of study is to reach its potential in the state.

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[1] Ralph C. Graber, Frederick K. Erickson, and William B. Parsons, "Manpower for Environmental Protection," Environmental Science and Technology, April, 1971, pp. 314-319.

TABLE I

NATIONAL MANPOWER NEEDS IN ENVIRONMENTAL OCCUPATIONS*

Occupational Classifications	Manpower Needs 1970	1980	Educational and/or Competencies Needed
Environmental Aides	100,000	185,000	High School graduate. Assists professional personnel and technicians in carrying out prevention, control and service programs. Performs routine tasks under supervision. Must desire to continue learning on the job.
Environmental Technician	70,000	215,000	Technicians are utilized in a variety of ways in environmental programs. The application of such skills includes, but is not limited to, inspections, surveys, investigations, evaluations and operation of facilities. To qualify as a technician the applicant will need post-secondary study.
Technologist	27,000	76,000	College graduate with specialty in some applied scientific field.
Scientist	11,000	32,000	Graduate study in scientific area to lead to broader participation in program planning and implementation areas.
Engineer	35,000	105,000	College graduate and graduate study with specialty in engineering and broad background in program development and implementation.

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*Adapted from Ralph C. Graber, et. al., "Manpower for Environmental Protection," Environmental Science and Technology, April, 1971, pp. 314-319.

TABLE II

ECOLOGY CAREERS: Here Are the Facts

By Sylvia Porter

How many high school and college age youngsters do you know who are determined to build careers in ecology-conservation?

Almost surely you know some, quite likely including your son or daughter. But, also almost surely, you have discovered that, although the kids have an over-all burning desire to be involved in the preservation of our planet, they have a minimum of specific knowledge about what types of jobs will be available, where the greatest employment opportunities will lie, how to get information on the details of each job category, where the new career frontiers will be.

Thus, to help the millions who are considering careers in this field, I've done some digging and now offer you this guide.

First, here are the estimated numbers who will be needed in key fields in 1980 as against those actually working today.

FIELD	WORKERS NOW	NEEDED BY 1980
Ecology	4,300	12,000
Geology	22,800	33,400
Geophysics	6,800	10,400
Meteorology	4,000	12,000
Oceanography	5,800	40,000
Forestry	25,000	37,000
Forestry Aids	13,000	23,800
Range Management	6,000	8,000
Soil Conservation	26,000	30,000
Wildlife Conservation	15,000	20,000
Fisheries Conservation	4,500	7,500
Recreation and Parks	215,790	220,000
Architecture	34,000	61,600
Engineering (construction)	40,000	70,000
Landscape Architecture	8,500	14,500
Urban Planning	7,000	15,600
Environmental Protection	217,500	565,000

In addition, more than 150,000 environmental health workers will be needed by 1980, about double the number of trained workers expected to be available. And tens of thousands will be required in fields ranging from microbiology to biomedical engineering, water quality management to computer science, marine biology to toxicology.

By 1980, about 1,200,00 workers will be needed in environmental careers, approximately twice the number for 1970.

But beyond even these traditional specialities, here are details on some newly developed fields, described in "opportunity in Environment Careers", by Odom Fanning (Universal Publishing and Distributing Corp., $5.75) and "Career Opportunities: Ecology, Conservation and Environmental Control" (J.G. Ferguson Publishing Co., Chicago, $6.95).

Environmental Psychology: a sparsely populated field, concerned with what one observer calls the "crisis in human dignity" in the face of environmental degradation;

Environmental Health Engineering: planning and operating programs for the prevention and control of environmental health hazards -- e.g., air and water pollution, rodent infestation;

Environmental Design: planning and building or rebuilding and restoring structures, neighborhoods, towns and outdoor spaces -- covering specialties from city planning to landscape architecture;

Environmental Geology: investigation of immediate and long-term environmental needs: sedimentation in lakes, waste disposal;

Environmental Education: teaching of a wide range of subjects on environment from kindergarten through graduate school;

Water Hygiene: study of chemical as well as bacteriological contamination of water supplies aimed at protecting consumers;

Radiological Health: control of dangerous levels of radiation -- from such devices as microwave ovens and atomic power plants;

Community Environmental Management: exploring solutions to the effects of such poverty conditions as overcrowding, rats, noise, and air pollution, etc., on the 15% who live in their midst.

Reproduced from Miss Porter's syndicated newspaper column of September 23, 1971.

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Appendix F - Suggestions and Procedures For Teaching-Learning Stations

PROGRAM AREA: Agricultural Education

CLUSTER AREA: Outdoor Recreation and Applied Ecology

DESCRIPTION: The area of Environmental Education consists of a group of related teaching units pertaining to Outdoor Recreation and Applied Ecology. Students enrolling in the course can expect to spend considerable time in outdoor activities commonly performed by workers in environmental occupations. Such may include, but are not limited to, activities that include working with our natural resources for others to use in their leisure time. It is anticipated that use and emphasis of particular units will depend on the nature of the community and needs of students and will be presented on this basis to persons generally in the organized learning situations of middle-grades, secondary schools and to interested and concerned adult groups. The course has been designed to enable the instructor to teach only those units or portions of units which are particularly applicable to the local situation. Therefore, no sequence has been suggested (units are numbered for reference purposes only) and wide ranges have been given in length of teaching units.

PURPOSE: The purpose of Agricultural Education in the area of Environmental Control is to provide learning experiences which will enable a person to develop knowledge, understanding, and skills necessary to making a meaningful choice, preparing for, entering into, and advancing in an Outdoor Recreation and Applied Ecology career. In addition, each student will hopefully develop an appreciation for the aesthetic values found in the great outdoors. These purposes will be accomplished both in the classroom and the laboratory; and also through extensive use of exploratory and supervised work experiences in the field of Outdoor Recreation and Applied Ecology. Occupational guidance and leadership development as provided by the FFA Youth Organization are integral parts of the learning process.

CREDITS: The course may be offered as:

1. A one hour, one year course, one unit for 180 hours.
2. A one hour, two year course, one unit for each 180 hours.
3. A two hour block, one year course, two units for 360 hours.

SPECIAL OR UNIQUE ASPECT OF PROGRAM: Separate units in Outdoor Recreation and Applied Ecology may be offered to adult groups based on the needs of the community. These needs may be determined by the Vo-ag teacher acting in conjunction with concerned adult groups.

Separate units in Outdoor Recreation and Applied Ecology may be offered to groups of young people during the summer at school camps and other outdoor facilities which may be available.

Facilities and projects developed by students as part of this course may be used for instructional purposes by other students and teachers in the local school system. One example of this might be the use of a nature trail, built by students in Outdoor Recreation and Applied Ecology, for teaching children in the primary grades.

It is strongly recommended that a special steering committee composed of persons with outdoor recreation interests be established when offering this course.

PHYSICAL FACILITIES: For a comprehensive offering in the area of Outdoor Recreation and Applied Ecology, the following facilities are needed.

1. 35-45 square feet of classroom space per pupil
2. 150-200 square feet of laboratory or shop space per pupil
3. Other facilities as determined by the individual instructor and administrative unit. These may be:
   a. A land laboratory near the school
   b. A body of water near the school
   c. A nature trail near the school
   d. A forest near the school
   e. Any commercial enterprise or public facility related to Outdoor Recreation and Applied Ecology.

EQUIPMENT: Existing equipment in vocational agriculture departments and that which is described on current state equipment lists. In addition, other equipment ranging from fishing equipment to air and water testing kits, will be necessary depending on units taught and the grade level of students. Interchange of equipment with biology and other science teachers will provide the opportunity to use more diverse teaching aids such as laboratory equipment.

MAJOR MATERIALS: Audio visual and physical items of equipment necessary to properly provide learning experiences in selected units along with related materials. Use of multiple learning areas and practical resource material is recommended.

TEACHER CERTIFICATION: Teacher certification requirements shall be primarily in the areas of:

1. Vocational A or G certificates via Agricultural Education degree or
2. Provisional Vocational A certificates (PVA) via a degree in Agriculture and Life Sciences or Forest Resources.

It is recommended that the teacher attend workshops pertaining to the broad areas within Outdoor Recreation and Applied Ecology; and that the teacher acquire firsthand knowledge of the occupations involved. One way to do this might be to spend time with people in the field, i.e., game warden, etc.

RECOMMENDED STUDENTS PER CLASS: 10-15 students

EVALUATION: In addition to periodic evaluation by the Division of Occupational Education of the N. C. State Department of Public Instruction, the following self and local evaluations should be made over and above those recommended in each unit:

1. Are units taught which are relative to the needs of students and the community?
2. How many students enter the field of Outdoor Recreation and Applied Ecology?
3. How many students continue their education in the area of Outdoor Recreation and Applied Ecology?
4. What physical and attitude changes have occurred in the community since the introduction of Outdoor Recreation and Applied Ecology to the school curriculum?

UNITS OF INSTRUCTION:

1. Introduction, Orientation, and Guidance
2. Developing Leadership
3. Ecological System
4. Outdoor First Aid
5. Land Use in Our Environment
6. Water Use in Our Environment
7. Plants in Our Environment
8. Forest in Our Environment
9. Construction for Outdoor Recreation
10. Machinery Use in Outdoor Recreation
11. Wildlife Populations
12. Wildlife Management
13. Harvesting Game Species
14. Golf Course Management
15. Commercial and Recreational Fishing
16. Camp Management Operation
17. Boating and Marina Management and Operation

18. Horses and Riding Stable Management and Operation
19. Parks and Recreational Area Management and Operation
20. Sewage and Waste Disposal in Our Environment
21. Air in Our Environment
22. Chemicals and Radiation in Our Environment
23. Noise in Our Environment
24. Thermal Pollution in Our Environment
25. Population in Our Environment
26. Mineral Resources in Our Environment

PART I

RECOMMENDED UNITS FOR INCLUSION IN COURSE

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 1 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Introduction, Orientation and Guidance

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. list the values of outdoor recreation and applied ecology in daily living.
2. identify the wide range of employment opportunities in outdoor recreation.
3. list steps needed in planning and conducting a suitable SOE program.
4. identify appropriate outdoor recreation and applied ecology activities for an SOE program.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 10-25 hours

EVALUATION: Student and teacher evaluation to include: (1) daily participation, (2) practical experiences, (3) supervised occupational experiences, (4) pre and post tests, (5) student (self) examination.

TEACHER COMPETENCY: Must have a working knowledge of: FFA activities, ecological systems, career and job information in outdoor recreation and familiar with SOE activities, and guidance procedures.

INSTRUCTIONAL MATERIALS:

Visuals: Filmstrips - Surviving The Ecology Crisis - SVE

Film: - Tom Lehner Sings Pollution 16mm

Slides: - Agriculture and Environment

Books: -
(1) Our natural Resources
(2) Handbook of Agricultural Occupations
(3) Supervised Practice in Vocational Agriculture

GENERAL COMMENT: Each student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 1 TITLE: Introduction, Orientation and Guidance

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. list the values of Outdoor Recreation & Applied Ecology in daily living

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Purposes and Objectives Studying	1. Class organize and carry out a camping, hiking or picnic activity to orient students to area of study.	LAP 1A Pre-test	1, 2, 3, 6, 4, 9, 10
A. Outdoor Recreation 1. hunting 2. fishing 3. camping 4. boating 5. hiking 6. picnicking 7. others	2. Students to share their experiences in outdoor life with class.	Student reports to class, instructor, or others	Learning Activity Packet (LAP) 1A
	3. Invite ~~an~~ outdoorsman in community to challenge class in outdoor recreation and ecology opportunities.	Student (self) evaluation	Teaching-Learning Static (TLS) 1 2 4 6 18
B. Applied Ecology in Relation to: 1. wildlife 2. forests 3. soil 4. water 5. air 6. people 7. domestic animals 8. agriculture 9. others	4. Class field trip to observe: a. pollution in local water areas b. soil erosion c. trash and garbage dumping along roads, in streams, lakes, rivers and in forests d. possible sources of air pollution	LAP 1A Post-test Student written reports	
	5. Class visit a farm to observe ecological factors and environmental influences.		
	6. Students make lists of local environmental problems.		
	7. Classroom study of materials to identify areas of interest.		

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TEACHING UNIT NO. 1 TITLE: Introduction, Orientation and Guidance

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

2. identify the wide range of employment opportunities in Outdoor Recreation

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
II. Employment Opportunities	1. Invite resource persons to class and/or have students to visit resource person and report to class on job requirements:	LAP 1B Pre-test	1, 4, 5
A. Levels of Employment			LAP 1B
1. professional	a. game wardens	Oral reports to class	
2. managerial	b. forest rangers		
3. technical	c. park rangers		11, 12, 13, 14, 15, 16, 17, 18, 19, 20
4. skilled	d. recreation camp operator	Written reports	
5. semi-skilled	e. forestry and conservation equipment operators		
6. clerical			
7. others	f. game manager		
	g. production forestry personnel		
B. Areas of Possible Employment	h. soil conservation aide	LAP 1B Post-test	
	i. tree surgeon		
1. local agencies	j. golf course managers		
2. state agencies	k. asc employees	Observations Teacher, Classmates	
3. national agencies	l. sports equipment employees		
4. private businesses	m. marina operators and employees		
	n. environmental engineers		
5. others	o. recreational directors		
	p. others		
	2. Explore how people find work in outdoor recreation and ecology fields.		
	3. Arrange for students to review occupational information sources and prepare bulletin board on findings.	Bulletin Board Techniques Student (self) evaluation	

TEACHING UNIT NO. 1 TITLE: Introduction, Orientation and Guidance

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. list steps in planning and conducting a suitable SOE Program.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Understanding and Relating Supervised Occupational Experience Program to Course and Employment Opportunities	1. Students visit and report on suitable part-time employment opportunities.	LAP 1C Pre-test	3, 7, 5
	2. Use resource persons to discuss with students how to get and keep a job in outdoor occupations.	Evaluate Individual SOE Record Books	LAP 1C
A. Purposes of Supervised Practice	3. Use FFA activities to encourage greater student involvement in unit.		21
B. Value and/or Importance of Supervised Practice	4. Assist students in designing a record keeping system.		
C. Establishing Requirements	5. Present award through FFA for student keeping best records.		
D. Determining Means of Meeting Requirements	6. Arrange class trip to a bank to learn about interest, banking activities and money management.	Oral reports to class	
E. Planning Individual Programs			
F. Writing Business Agreements			
G. Conducting the Program			
H. Developing Desirable Relationships Between			

TEACHING UNIT NO. 1 TITLE: Introduction, Orientation and Guidance

TEACHING UNIT OBJECTIVES: 3. (cont'd) list steps in planning and conducting a suitable SOE Program

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
1. students 2. employers 3. parents 4. teachers			22
I. Keeping Work Experience Records 1. purpose and use 2. expense records a. supplies b. labor c. taxes d. insurance e. interest f. depreciation g. capitol expenditures 1. machinery 2. equipment 3. buildings 4. fences 5. others 3. income records a. cash receipts b. non-cash receipts 4. making inventories a. beginning of year b. end of year		Class Demonstration of different types of record book entries	
J. Meeting Labor Requirements 1. understanding labor regula-	7. Invite a resource person to discuss employment or labor office problems with students.		

TEACHING UNIT NO. 1 TITLE: Introduction, Orientation and Guidance

TEACHING UNIT OBJECTIVES: 3. (cont'd) list steps in planning and conducting a suitable SOE Program

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
2. obtaining work permits 3. obtaining social security number	8. Secure applications and help students obtain a social security card.		
K. Evaluate Records to Determine 1. profits 2. losses 3. needed changes	9. Hold individual student conferences to discuss their supervised occupational experience program.	LAP 1C Post-test Student (self) evaluation	

TEACHING UNIT NO. 1 TITLE: Introduction, Orientation and Guidance

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

4. identify appropriate Outdoor Recreation and Applied Ecology Activities for an SOE Program

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
IV. Relating Activities in Outdoor Recreation and Applied Ecology to FFA Program of Work		LAPS 15A, 15B, 15C, 16A, 16B Pre-tests	8
A. Chapter Recreational Activities 1. planning and going camping 2. attending FFA camp 3. planning and going hunting or fishing 4. planning and having picnic or chapter cook-outs 5. planning and going hiking 6. others	1. Appoint planning committee.	Evaluate daily individual participation in activities LAPS 15A, 15B, 15C, 16A, 16B Post-tests	LAPS 16A, 15A, 15B, 15C 46 11, 12, 13
B. Chapter Improvement and/or Ecological Activities 1. planning and conducting 2. constructing community picnic and/or recreational area	2. Invite FFA chapter president to discuss with the class the FFA proficiency awards emphasizing soil, water, and air management, outdoor recreation, and fish and wildlife management.		

TEACHING UNIT NO. 1 TITLE: Introduction, Orientation and Guidance

TEACHING UNIT OBJECTIVES: 4. (cont'd) identify appropriate Outdoor Recreation and Applied Ecology Activities for an SOE Program

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
3. constructing and erecting wildlife nesting boxes 4. planning and establishing nature trail	3. Planning committees to select appropriate class activities and make plans for implementing those selected.	LAP 19A Pre-test	LAP 19A
5. constructing and placing wildlife feeding stations 6. planning and planting wildlife areas 7. planting forest seedlings on waste lands	4. Written student evaluations of unit.	LAP 19A Post-test Demonstrate construction of wildlife boxes Student (self) Observation teacher, classmates	

SUGGESTED RESOURCES

A. BOOKS:

1. Outdoors USA, USDA Yearbook of Agriculture, The Superintendent of Documents, Washington, D. C. 20402, 1967.

2. Our Natural Resources, McNall, P. E. and Kircher, Harry B., The Interstate Printers and Publishers, Inc., Danville, Illinois, 1970.

3. Forests and Forestry, Anderson, David A. and Smith, William S., The Interstate Printers and Publishers, Inc., Danville, Illinois, 1970.

4. Rural Recreation for Profit, Smith, Clodus R., Partain, Lloyd E. and Champlin, James R., The Interstate Printers and Publishers, Inc., Danville, Illinois, 1968.

5. Handbook of Agricultural Occupations, Hoover, The Interstate Printers and Publishers, Danville, Illinois.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

6. Wildlife Magazine, North Carolina Wildlife Resources Commission, Raleigh, N.C.

7. Supervised Practice in Vocational Agriculture, Miller, T. R., The Interstate Printers and Publishers, Inc., Danville, Illinois, 1967.

8. Official FFA Manual, Future Farmers Supply Services, Alexandria, Virginia.

C. AUDIOVISUALS:

9. Agriculture and the Environment (slides and script). The Vernard Organization, 113 N. E. Madison, Peoria, Illinois 61602.

10. Tom Lehner Sings Pollution (16 mm film). Astrofilms, Inc., Washington, D. C.

D. AGENCIES:

11. Wildlife Commission.

12. N. C. Forest Service.

13. Federal Forest Service.

14. Parks Service.

15. Local Camp Operator.

16. Soil Conservation Service.

17. ASC Office Manager

18. Sports Equipment Sales Manager.

19. Marina Operator

20. Health Department.

21. Local Bank Officer

22. FFA Supervised Practice Record Book.

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 2 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Developing Leadership

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. conduct meetings and organized group activities.
2. identify the reasons for getting along with classmates and others.
3. describe personal characteristics necessary for employment.
4. list abilities needed for successful working relations.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Teacher approval

TEACHING UNIT LENGTH: 10-20 hours

EVALUATION: A combination of student-teacher evaluation to include: (1) pre-post tests, (2) self (student) evaluation, (3) peers evaluation, (4) teacher observation - (doing phase of conducting a group meeting).

TEACHER COMPETENCY: Have a working knowledge of parliamentary procedure and leadership activities.

INSTRUCTIONAL MATERIALS:

Books:
(1) Roberts Rules of Order
(2) Helps in Mastering Parliamentary Procedure
(3) Handbook for Conducting FFA Meetings
(4) Official Manual for Future Farmers of America
(5) Parliamentary Procedure in Action

GENERAL COMMENT: Each student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local local schools, recreational areas and businesses.

TEACHING UNIT NO. 2 TITLE: Developing Leadership

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. conduct meetings and organize group activities
2. identify the reasons for getting along with classmates and others

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Parliamentary Procedure	1. Present class with a problem needing action to see how group reacts to situation.	LAPS 1, 6, 3A Pre-test	1, 10, 4, 8, 9, 3
A. Review parliamentary procedure rules and terminology B. Conducting Meetings	2. Students role-play different leadership roles: president, vice-president, secretary, treasurer, reporter, sentinel, committee chairman, etc.	Student participation Teacher observation Check list	LAPS 1, 6, 3A
C. Committees 1. functions 2. planning 3. reporting	3. Review parliamentary procedure handbook where needed.	LAP 1, 6, 3A Post-test	
D. Developing Chapter Activities	4. Divide class into committees; plan and report on ecological activity possibilities.		
	5. Develop chapter activities applicable to this class.		
	6. Students to visit local civic clubs to observe how meetings are conducted.		
	7. Elect class officers and set up committees.		
II. Self Improvement and Development A. Manners	1. Students role-play grooming, dress and health habits of youth today.	LAP 7, 5 Pre-test	LAPS 7 and 5
B. Courtesy C. Grooming	2. Invite a resource person (Home Economics teacher, guidance Counselor, personnel manager, etc.) to discuss self-improvement and development topic.	Oral test Student (self) evaluation	9, 14, 17

TEACHING UNIT NO. 2 TITLE: Developing Leadership

TEACHING UNIT OBJECTIVES: 2. (cont'd) identify the reasons for getting along with classmates and others

Upon completion of this unit, the student will be able to:

3. describe personal characteristics necessary for employment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
D. Dress	3. Identify individuals with problems for referral to appropriate sources.	LAP 7 and 5 Post-test	
E. Health			
F. Conversation			
G. Introductions			
II. Publicity and Public Relations	1. Students select topic on outdoor recreation and ecology theme and prepare report for class.	LAP 9 Pre-test	11, 2, 9 LAP 9
A. Public Speaking 1. preparing and writing speeches 2. speaking mannerisms and gesters	2. Permit students to operate audio visual equipment used in giving reports	Student participation Teacher check list	
3. platform etiquette	3. Students to give oral reports to class.		
4. reacting to questions and challenges	4. Students to critique each speech.	LAP 9 Post-test	
5. using visual equipment a. movie projectors b. slide and film strip projector c. tape recorders and record players d. overhead projector			
B. Taking Pictures 1. types of cameras 2. types of film 3. techniques	1. Invite resource persons to class (amatures, local photographers, newspaper photographers, etc.) to demonstrate his work		

TEACHING UNIT NO. 2 TITLE: Developing Leadership

TEACHING UNIT OBJECTIVES: 3. (cont'd) describe personal characteristics necessary for employment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
a. camera adjustments b. lighting c. using flash d. setting-up shots	2. Visit local camera shop and observe equipment and secure reference materials.		
	3. Select a theme appropriate to course and permit each student to photograph a scene for a class display.		
C. Writing News Articles 1. determining what is news worthy 2. reporting news 3. obtaining facts and statistics 4. use of pictures with articles	1. Invite resource persons to class to explore what to include in an article on the course for the school paper.	Evaluation of radio program by fellow students of participants.	
	2. Visit newspaper office to see what writers do there.		
	3. Appoint committee to work with instructor in preparing article for school paper.		
D. Understanding Radio and Television Techniques	1. Visit radio station to observe work situation.	Students evaluation of fellow students demonstration of telephone use.	
	2. Visit television station to observe work situation.		
	3. Students plan and present program of local interest on outdoor theme.		
E. Using the Telephone 1. etiquette 2. conversation 3. dialing 4. using directories	1. Students role-play the use of the telephone.		
	2. Secure telephone directories and teach students to use.		
	3. Students to use telephone directory in		

TEACHING UNIT NO. 2 TITLE: Developing Leadership

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

4. list abilities needed for successful working relations

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Succeeding on the Job A. Applying for a Job 1. writing letters of application 2. filling out application forms	1. Students to interview a neighbor to determine how he secured present job. Share findings with class.	LAP 2 A Pre-test	5, 2, 6, 7, 14, 15, 16, 17, 18, 19, 20
	2. Write letters of application for a job.	Teacher check list written test or oral test	
	3. Secure application forms and review with class to point out similarities and differences.		
B. Going for Interviews 1. dress 2. grooming 3. promptness 4. manners 5. tact	1. Use resource persons.	Students evaluation of interview demonstration by fellow student.	LAP 2A
	2. Role play--one student be the employer and another the applicant.	Observation teacher, classmates	
C. Personality Development	1. Students evaluate one another in terms of abilities needed for employment.		
	2. Students evaluate themselves in terms of abilities needed for employment.	LAP 2A Post-test	
D. Developing Proper Work Habits 1. promptness 2. accuracy 3. neatness 4. wise use of time 5. others	1. Students to keep a record of time spent in class for one week.		
	2. Assign groups of students a simple task to complete in five minutes. Discuss each groups' progress and analyze problems experienced by groups in working on the assignment.		

TEACHING UNIT NO. 2 TITLE: Developing Leadership

TEACHING UNIT OBJECTIVES: 4. (cont'd) list abilities needed for successful working relations

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
E. Relations with Management	1. Secure successful business leader or employer. Speak to class on what is expected of new employee.	Student (self) evaluation	14, 19, 20
F. Relations with Other Employees	2. Have former student report to class his employment experiences.	Student peers evaluation of student report.	LAPS 4, 8, 16
G. In-Service Training 1. self-improvement 2. performance improvement			

SUGGESTED RESOURCES

A. BOOKS:

1. Roberts Rules of Order (revised). Robert, H. M., 75th Anniversary edition, Scott-Foresman, Chicago, Illinois, 1951.
2. The Secretary's Handbook, Taintor, S. A. and Monro, K. M., The MacMillan Company, 866 3rd. Ave., New York, N.Y., 1969.
3. The Club Officers In Action, The Interstate Printers and Publishers, Inc., Danville, Illinois.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

4. Helps in Mastering Parliamentary Procedure, Stewart, Wilbur F., Inc., Co-Op Printshop, New Concord, Ohio, 1965.
5. What Could I Be? Lifton, Walter M., Science Research Associates, Chicago, Illinois 1968.
6. Jobs in Your Future, Lee, Miriam, Scholastic Book Services, New York, N.Y., 1968.
7. Applying for a Job, Rath, Mason, Phipps, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1969.
8. Handbook for Conducting FFA Meetings, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1970.
9. Official Manual for Future Farmers of America, Future Farmer Supply Service, Alexandria, Virginia, 1970.
10. Parliamentary Procedure in Action, The Interstate Printers and Publishers, Inc , Danville, Illinois.
11. Advisors Teaching Guide on FFA, Future Farmers of America and Massey-Ferguson Inc., U.S. Office of Education, Dept. of Health, Education, and Welfare, Washington, D. C. 20202.
12. The New FFA, Student performance objectives, National FFA Organization, U.S. Offic of Education, Dept. of Health, Education, and Welfare, Washington, D.C. 20202.
13. LAPS, Leadership units, N. C. Dept. of Public Instruction, Occupational Education.

AUDIOVISUALS:

14. Are Manners Important, Modern Talking Pictures, 503 N. College St., Charlotte, N. 28202.
15. Getting and Keeping Your First Job, Guidance Accociates, Pleasantville, N. Y.
16. What You Should Know Before You Go To Work, Guidance Associates, Pleasantville, N.
17. Your Job Interview, Guidance Associates, Pleasantville, N.Y.
18. Why Work At All? Guidance Associates, Pleasantville, N.Y.
19. Trouble at Work, Guidance Associates, Pleasantville, N.Y.
20. Liking Your Job and Your Life, Guidance Associates, Pleasantville, N.Y.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 3 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Ecological Systems

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. describe man's relationship and dependence on ecological systems.
2. identify local problems which cause an eco-system imbalance.
3. describe possible solutions to local problems which may be causing an eco-system imbalance.
4. participate in a class activity that will improve a local ecological problem

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Teacher/student evaluation awareness of the ecological system and the problems related to it, job performance, teacher observations lab exercises and pre and post tests.

TEACHER COMPETENCY: Must know the ecological systems and have a working knowledge of those systems.

INSTRUCTIONAL MATERIALS:

Books: - (1) Conserving American Resources
(2) Our Natural Resources
(3) North Carolina Teacher Guide for Environmental Education

Visuals: Filmstrip - Surviving the Ecology Crisis.

GENERAL COMMENT: Each student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas and businesses.

TEACHING UNIT NO. 3 TITLE: Ecological Systems

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. describe men's relationship and dependence on ecological systems

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Introduction A. Ecosystem Concept	1. Students compile a list of ecosystems. (A stream, a pond, a field, an aquarium, etc.)	Pre-test LAP 3A Report on field trips	1, 2, 4 LAP 3A
B. Ecosystems Exist in the Real World	2. Field trip to observe several ecosystems.	LAP 3A Post-test	5
II. Man's Relationship to His Environment A. Soils	1. Students select and survey a community as to land use, water systems industry, streams, waste disposable systems, etc.	LAP 3B Pre-test Student report on surveys	TLS 1, 12, 24, 26 1, 2, 3, 4, 5, 7, 8
B. Plants C. Water	2. Students determine the number of cars in a county or city and determine contribution to air pollution.	Student (self) evaluation	
D. Air E. Animals	3. Have your students trace the effects that an auto has on the environment from the day it is sold to the day it is destroyed.	Observation teacher, classmates	
	4. Have your students keep track of the items they throw away in one week period.		
	5. Have your students determine the gallons of water used at school in one week.		
	6. Class discussion on how to promote a balance between man and his environment.		
	7. Class discussion on the understanding of the ecological system and natural resources important to the [illegible]		

TEACHING UNIT NO. 3 TITLE: Ecological Systems

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

2. identify local problems which cause an eco-system imbalance

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SIGGESTED RESOURCE MATERIALS
III. Local and National Problems	1. Have your students compile a list of local and national pollution problems.	Students report on their findings.	2, 5, 6, 7, 4
		Oral and written	
IV. Defining Local Problems	1. Students select and survey a community to determine environmental problems.	Students report findings on surveys	2, 7, 8
	2. Have your students compile a list of the environmental problems on their farm or home.	Student (self) evaluation	
	3. Use selected students to photograph local environmental problems.		
	4. Use resource person to identify jobs which deal with ecological problems. (Environmental engineer, county health inspectors, etc.		

TEACHING UNIT NO. 3 TITLE: Ecological Systems

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. describe possible solutions to local problems which may be causing an eco-system imbalance

4. participate in a class activity to improve a local ecological problem

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
V. Possible Solutions to Local Problems Including Class Activities to Improve Local Ecological Problem.	1. FFA and class activities: a. plan and conduct community clean-up programs. b. promote local sewage and garbage disposal systems c. promote local environmental educational programs d. use and maintenance of horticulture plants and landscape design in recreational areas and parks e. plan and establish nature trails f. plan and build picnic tables for local recreational areas and parks g. participate in Building Our American Community programs h. plan and establish recreational areas	Build a picnic table Submit a list of school and community activities that you have taken part in LAP 3B Post-test	9, 7, 8, 3

SUGGESTED RESOURCES

A. BOOKS:

1. Our Natural Resources, McNall, P. E. and Kirchner, Harry B., The Interstate Printers and Publishers, Inc., Danville, Illinois, 1970.

2. A Selected Bibliography of Films and Books for Natural Resources - Ecology Classes. Dreischmeir, W. B. and Thompson, John F., Department of Agricultural and Extension Education, The University of Wisconsin, 208 Ag. Hale, Madison, Wisconsin.

3. Conserving American Resources, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1956.

4. U. S. Department of the Interior Conservation Yearbooks:
   Quest for Quality. Yearbook #1.
   It's Your World. Yearbook #5.
   The Population Challenge. Yearbook #2.
   The Third Wave. Yearbook #3.
   River of Life. Yearbook #6.
   Man An Endangered Species. Yearbook #4.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

5. North Carolina Teacher Guide for Environmental Education, N. C. Department of Public Instruction, Raleigh, N. C.

6. From Sea to Shining Sea, The President's Council on Recreation and Natural Beauty. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, 1968.

D. AGENCIES:

7. Local Health Department.

8. Soil Conservation Service.

9. BOAC Program.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 4

TEACHING UNIT TITLE: Outdoor First Aid

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the importance of first aid abilities and skills needed in outdoor recreatio and applied ecology occupations.
2. list OSHA standards affecting OR&AE occupation.
3. describe the scope and limitations of first aid.
4. demonstrate the ability to use first aid techniques in simulated situations.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 10-20 hours

EVALUATION: (1) Pre and post test, (2) lab exercises, (3) teacher observations, (4) daily participation and attitudes.

TEACHER COMPETENCY: Red Cross First Aid course or commensurate training.

INSTRUCTIONAL MATERIALS:

Books:		First Aid Textbook Boy Scouts of America Poisonous Snakes of Eastern United States
Visual:	Film	First Aid Now - 16mm

GENERAL COMMENT: Students should be encouraged to participate in work experiences, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas and businesses.

TEACHING UNIT NO. 4 TITLE: Outdoor First Aid

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify the importance of first aid abilities and skills needed in outdoor recreation and applied ecology occupations
2. list OSHA standards affecting OR&AE occupations

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Relationship of First Aid to Outdoor Occupations A. Occupations Requiring First Aid Skills 1. identify occupations 2. type of first aid needed or required in each occupation	1. Have a professional worker in some outdoor recreational occupation - discuss first aid requirements of his occupations and others with which he is familiar.	LAP 4A Pre-test	1, 2, 5 LAP 4A
	2. Review "OSHA" act with students and discuss implications for outdoor occupations.	Written test on "OSHA"	
B. Occupational Safety and Health Act (OSHA)			
II. Treatment of Wounds and Injury To Bones and Joints	1. Describe and discuss kinds of wounds in classroom and the proper first aid treatments.	Written or oral tests	1, 12, LAP 4A
A. Wounds 1. abrasions 2. incised wounds 3. lacerated wounds 4. puncture wounds 5. internal bleeding 6. nose bleed	2. Set up simulated wounds using students as patients and have others administer first aid.	Observations by teachers and students of simulated first aid skills.	
	3. Use similar procedure suggested above for fractures and sprains.	Use check list	
B. Fractures 1. symptoms 2. treatment			
C. Head Injury			

TEACHING UNIT NO. 4 TITLE: Outdoor First Aid

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. describe the scope and limitations of first aid

4. demonstrate the ability to use first aid techniques in simulated situations

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Treatment of Shock A. Signs and Symptoms 1. causes 2. danger	1. Discuss shock in classroom, emphasizing symptoms, causes and dangers.	Student participation Teacher observations and check list.	1, 12 LAP 4A
B. First Aid	2. Have students set up simulated situations and administer first aid and treatment.	Student (self) evaluation	
IV. Artificial Respiration A. Breathing	1. Describe and discuss principles of breathing and conditions where artificial respiration may be needed.	Written or oral tests student participation.	1, 12 LAP 4A
B. Conditions Where Artificial Respiration May Be Helpful 1. electric shock 2. drowning 3. poisoning by gas 4. other	2. Set up simulated conditions with students as patients and students develop ability to administer first aid.	Teacher observations and check list.	
V. Poisoning By Mouth A. Kinds of Common Poisons	1. Discuss types and kinds of poisons which are common to area.	Student participation in discussions, surveys and bringing materials.	1, 12 LAP 4A
B. Signs and Symptoms C. First Aid	2. Have students make a home survey of poisons in their home, and discuss reports in class.	Teacher and student observations of reports	
	3. Bring materials to classroom which are common poisons and materials used as first aid treatment and discuss their uses.	Written or oral tests	

TEACHING UNIT NO. 4 TITLE: Outdoor First Aid

TEACHING UNIT OBJECTIVES: 4. (cont'd) demonstrate the ability to use first aid techniques in simulated situations

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
VI. Poisonous Plants A. Identification	1. Students use pictures, slides or live plants to identify poison ivy, poison oak, and poison sumac.	Written or oral tests. Student participation	1, 3, 4 LAP 4A
B. Signs and Symptoms	2. Use visuals to show signs and symptoms of poisoning.		
C. First Aid	3. Discuss first aid for skin poisoning.		
VII. Snake Bites A. Identify Poisonous Snakes of N. C.	1. Have students prepare bulletin board showing poisonous snakes and non-poisonous snakes common to the area.	Teacher evaluation of bulletin board. Teacher observation of student participation.	1, 2, 3 LAP 4A
B. First Aid for Snake Bite	2. Have an approved first aid snake bite kit in classroom and have students use it under simulated conditions.		
C. Spider and Insect Bites 1. identify 2. treatments	3. Have classroom discussions concerning poisonous spider and insects common to the area and suggested preventive and treatment measures.		

TEACHING UNIT NO. 4 TITLE: Outdoor First Aid

TEACHING UNIT OBJECTIVES: 4. (cont'd) demonstrate the ability to use first aid techniques in simulated situations

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHINQUES	SUGGESTED RESOURCE MATERIALS
VIII. Burns, Effects of Heat and Cold	1. Have each student plan a fire escape route for his home and family.	Written or oral test	1, 12
		Evaluate fire escape routes.	LAP 4A
A. Thermal Burns	2. Have class study and discussion of different degrees of thermal burns and approved treatments.	Student participation.	
B. First Aid		LAP 4A - Post-test	
C. Escape from Fire	3. Examine and discuss school firedrill and evacuation plans.		
D. Sunburn and Chemical Burns	4. Each student should be involved in treating simulated burns on fellow students.		
E. Effects and Treatment of Excessive Heat Problems	5. Have class discussion on excessive heat and cold problems and approved first aid for each.		
F. Effects and Treatment of Excessive Cold			
IX. Transportation of Injured Persons	1. Have class discussion on various situations where patients need to be moved and emergency measures which will work.	LAP 4B. Pre-test	1, 12
		Teacher and student observations of student participation	LAP 4B
A. Methods of Transfer 1. short distance 2. long distance 3. vehicle transfer	2. Have blankets, poles, stretcher or other materials available and simulate emergencies having each student involved as patient or first aider.	LAP 4B Post-test	
B. Preparation of Patient		Student (self) evaluation	

SUGGESTED RESOURCES

A. BOOKS:

1. First Aid Textbook, The American National Red Cross, Washington, D. C. (see local Red Cross Chapter).

2. Boy Scout Manual, Boy Scouts of America, Washington, D. C.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.

3. Poisonous Snakes of the Eastern U. S. N. C. Department of Agriculture, Raleigh, N.

4. Things You Should Know About Poison Ivy, Poison Oak, Poison Sumac in North Carolina. N. C. Agricultural Extension Service, Circular 57, March, 1974.

5. Occupational Safety and Health Act, U. S. Department of Labor, Washington, D. C. 20210.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural resources OE CODE: 01.06

TEACHING UNIT NO. 5 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Land Use in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify occupational possibilities in land use technology and related fields.
2. list land uses in relation to our environment.
3. compare land use in pertinent situations either at home or at school.
4. describe the characteristics of soils found in the area.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-25 hours

EVALUATION: Student and teacher evaluation based on daily activities and practical experiences including supervised occupational experience. Also pre-post tests.

TEACHER COMPETENCY: Soil or land use technology background or commensurate training, a working knowledge of laws and regulations pertaining to ecology.

INSTRUCTIONAL MATERIALS:

Books: - (1) Occupations in Environmental Control
(2) Soil Science in the South East
(3) Our Natural Resources
(4) Conserving American Resources

Visual: Filmstrip - Soil and the Agricultural Environment.

GENERAL COMMENT: Each student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas and businesses.

TEACHING UNIT NO. 5 TITLE: Land Use In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify occupational possibilities in land use technology and related fields
2. list land uses in relation to our environment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities A. Scope and Availability B. Kinds and Description C. Requirements for Entry and Advancement 1. education 2. experience 3. physical 4. others	1. Invite soil conservationist to come to class and discuss his responsibilities and requirements for other jobs in this field. Common tools used in these occupations may be demonstrated. 2. Arrange for students to interview a person who works in an occupation involving the use of land.	Daily evaluation of individual participation in learning activities.	4, 7, 10
II. Land Use	1. Study soil profiles of area.	FFA Land Judging Contest to score student soil use knowledge.	1, 2; 5, 7
A. Definition of Soil 1. structure 2. permeability 3. land classes	2. Arrange for students to collect soil samples.	LAP 5A Pre-test	LAP 5A
	3. Arrange for students to use organic soil testing kit on different soils.	LAP 5C Pre-test	Teaching-Learning Station 2
B. Societal Values and Land Use 1. agriculture use 2. non-agriculture use	4. Visit different soil conditions in the county and observe how each is presently utilized.	Student (self) evaluation	LAP 5C
	5. Study the value of land in the school area.		
	6. Visit a land fill area.		
	7. Arrange for students to use soil survey maps and photos.		

TEACHING UNIT NO. 5 TITLE: Land Use In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. compare land use in pertinent situations either at home or at school

4. describe the characteristics of soils found in the area

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Relationship to Other Natural Resources and to Man	1. Students to develop a list of relationships between man and soil in the community.	LAP 5B Pre-test	7, 5, 11 LAP 5B
IV. Land Development	1. Visit a local recreation facility, such as a lake resort, to observe overall plan.	Evaluate SOE program of individual students in area of soils management.	1, 2, 9, 3, 5
A. Location			
B. Value	2. Survey how developing land influences the economic value of other land in the area.		
V. Public Lands	1. Visit a state, national, or city park to observe workers and program.	Observation teacher, classmates	6, 3
A. State Parks			
B. National Parks	2. Have a representative of a recreational area to discuss laws that regulate their use.		
C. City or County Parks			
D. Public Buildings			
E. Highways			
VI. Pollution Affecting Land	1. Students to observe any type of land abuse near school, erosion, industrial waste, etc.	LAP 5A Post-test	7, 8, 11
A. Types		LAP 5B Post-test	
B. Corrective Measure	2. Invite soil conservationist to discuss programs involved in correcting land abuse.		

TEACHING UNIT NO. 5 TITLE: Land Use In Our Environment

TEACHING UNIT OBJECTIVES: 4. (cont'd) describe the characteristics of soils found in the area

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
VII. Laws and Regulations Concerning Land Use and Abuse	1. Students to hold a class hearing on land abuse. 2. Invite city or county official to speak to class on local laws concerning zoning, etc.	LAP 5C Post-test	8

SUGGESTED RESOURCES

A. BOOKS:

1. Our Natural Resources, McNall, P. E. and Kirchner, Harry B., The Interstate Printers and Publishers, Inc., Danville, Illinois.

2. Outdoors U.S.A., The Yearbook of Agriculture, 1967, The United States Government Printing Office, The Superintendent of Documents, Washington, D. C. 20402.

3. Handbook of Agricultural Occupations, Hoover, Norman K., The Interstate Printers and Publishers, Inc., Danville, Illinois.

4. Occupations in Environmental Control, Lewis, Wiley B., The Center for Vocational and Technical Education, The Ohio State University, 1900 Kenny Road, Columbus, Ohio 43210.

5. Conserving American Resources, Parson, Ruben L., Second Edition, Prentice Hall, Inc., Englewood Cliffs, N. J.

6. Soil Science in the South East, Welsh, C. D., The University of North Carolina Press, Chapel Hill, N. C.

7. Conserving American Resources, Parson, Ruben L., Second Edition, Prentice Hall, Inc., Englewood Cliffs, N. J.

8. Department of the Interior Conservation Yearbooks:
   Quest for Quality
   The Population Challenge
   The Third Wave
   Man, An Endangered Species
   It's Your World
   River of Life

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

9. Teacher's Guide for Environmental Education, The North Carolina Department of Public Instruction, Raleigh, N. C.

10. The Farm Index, The United States Department of Agriculture, Washington, D. C.

11. Land Judging In North Carolina, N. C. Extension Service, Raleigh, N. C.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 6 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Water Use in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. list jobs and careers involving our water resources.
2. describe the importance of water resources in our environment.
3. identify the citizen's responsibilities in maintaining clean water.
4. collect and analyze water samples.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5 - 15 hours

EVALUATION: A combination of student/teacher evaluation to include: (1) Pre and post test, (2) student (self) evaluation of progress made, (3) teachers observations.

TEACHER COMPETENCY: Working knowledge of laws and regulations pertaining to water pollution and treatment.

INSTRUCTIONAL MATERIALS:

Visual: Filmstrips - (1) Water and the Agricultural Environment.
(2) Surviving the Ecology Crisis.

Books: - (1) Our Natural Resources.
(2) Occupations in Environmental Control.
(3) Conserving American Resources.

GENERAL COMMENT: Each student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas and businesses.

TEACHING UNIT NO. 6 TITLE: Water Use In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. list jobs and careers involving our water resources
2. describe the importance of water resources in our environment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities	1. Invite a person whose work involves our water resources to class to discuss job opportunities.	LAP 6 Pre test	1, 10, 4,
A. Scope and Availability	2. Arrange for students to write different companies to determine job opportunities in this area.	Teacher evaluate student Participation in writing different companies and other class activities.	LAP 6
B. Kinds and Description		Written or oral tests.	
C. Requirements for Entry and Advancement 1. education 2. experience 3. physical 4. others			
II. Relationship to Other Natural Resources and to Man	1. Students list ways water affects other natural resources and man.	Teacher observe student participation.	1, 9, 3, 6, 7, 11
	2. Have class discussion.		LAP 6
	3. Design, construct and maintain soil erosion test plot.	Written or oral tests.	
	4. Use soil erosion teaching-learning station.		

TEACHING UNIT NO. 6 TITLE: Water Use In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. identify the citizen's responsibilities in maintaining clean water

4. collect and analyze water samples

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Water Use A. Importance to Plants and Animals B. Water Management C. Swimming Pools 1. types 2. maintenance D. Farm Ponds	1. Visit water treatment plant and observe how water is processed. 2. Students to sample sources of drinking water in school area. Send samples to county or state health office for analysis, and review results with class. 3. Visit an electric (hydro) plant and observe the process. 4. Visit swimming pool and observe how filters are cleaned and chemicals are regulated. 5. Have a life guard visit class and talk on the requirements and responsibilities of his job. 6. Cooperate with biology teacher so that students may observe water samples under a microscope.	Teacher observation of student participation. Class discussion and reports on field trips.	1, 2, 9, 5, 8
IV. Water Pollution A. Source and Type of Water Pollution B. Results of Water Pollution 1. health 2. economic 3. aesthetic	1. Study rural and urban water purification systems. 2. Invite county official to visit class and discuss programs involving water pollution. 3. Students take samples from various water sources, test, analyze results.	Teacher observations and records of student participation. Written or oral tests.	9, 4, 5, 7, 8, 11 LAP 6

TEACHING UNIT NO. 6 TITLE: Water Use In Our Environment

TEACHING UNIT OBJECTIVES: 4. (cont'd) collect and analyze water samples

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
C. Taking Water Samples			
V. Laws and Regulations	1. Arrange for students to hold a class hearing on water pollution.	Teacher and student ratings of student participation.	TLS 6
A. State			9, 5, 8, 11
B. Federal	2. Determine what is required of citizens in establishing water quality standards.	LAP 6 Post-test	LAP 6
C. Local		Student (self) evaluation	
	3. Write different companies to determine their water quality standards.		
	4. Collect water samples from various sources in cooperation with county sanitation department and send to laboratory for analysis.		

SUGGESTED RESOURCES

A. BOOKS:

1. Our Natural Resources, McNall, P. E. and Kirchner, Harry B., The Interstate Printers and Publishers, Inc., Danville, Illinois.

2. Outdoors U.S.A., The Yearbook of Agriculture, 1967, The United States Government Printing Office, The Superintendent of Documents, Washington, D. C. 20402.

3. Handbook of Agricultural Occupations, Hoover, Norman K., The Interstate Printers and Publishers, Inc., Danville, Illinois.

4. Occupations in Environmental Control, Lewis, Wiley B., The Center for Vocational and Technical Education, The Ohio State University, 1900 Kenny Road, Columbus, Ohio 43210.

5. Conserving American Resources, Parson, Ruben L., Second Edition, Prentice Hall, Inc., Englewood Cliffs, N. J.

6. Soil Science in the South East, Welsh, C. D., The University of North Carolina Press, Chapel Hill, N. C.

7. Conserving American Resources, Parson, Ruben L., Second Edition, Prentice Hall, Inc., Englewood Cliffs, N. J.

8. Department of the Interior Conservation Yearbooks:
   Quest for Quality
   The Population Challenge
   The Third Wave
   Man, An Endangered Species
   It's Your World
   River of Life

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

9. Teacher's Guide for Environmental Education, The North Carolina Department of Public Instruction, Raleigh, N. C.

10. The Farm Index, The United States Department of Agriculture, Washington, D. C.

11. Rules, Regulations, Classifications and Water Quality Standards Applicable to the Surface Waters of N. C. Board of Water and Air Resources, Department of Water and Air Resources, Raleigh, N. C.

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WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 7 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Plants in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the occupational opportunities associated with plants.
2. compare and contrast the effects of environment on plants.
3. list plants most commonly utilized in recreational areas.
4. describe ways plants may be cared for at school, at home, or in the community.

SUGGESTED TEACHING UNIT SEQUENCE: Based on student-teacher conference.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Student will write an evaluation at the completion of the unit to determine if stated unit objectives have been achieved, pre and post tests.

TEACHER COMPETENCY: Must have a working knowledge of botany, biology, and plant materials; also knowledgeable of job opportunities in plant and ecological areas.

INSTRUCTIONAL MATERIALS:

Books: - (1) Forest and Forestry
(2) Plants and the Eco-System
(3) The World of Plant Life

Visual: - What is Ecology

GENERAL COMMENT: Each student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas and businesses.

TEACHING UNIT NO. 7 TITLE: Plants In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify occupational opportunities associated with plants
2. compare and contrast the efforts of environment or plants
3. list plants most commonly utilized in recreational areas

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupations in Plant Production A. Field Crops B. Pasture C. Forestry D. Horticulture	1. Students explore an occupation that involves working with plants and give an oral report to the class. Coordinate reports and let class discuss other important areas of employment in these fields. 2. Students invite an appropriate speaker to discuss his work with class.	Students report to class	5, 6, 7, 8, 12, 16, 17
II. Plants and Their Environment A. Sunshine and Shade B. Chemical and Gas C. Pollutant Effects	1. Arrange field trip for class where plants are growing to observe effect of environment on plant growth. Each student will be expected to select a problem area for further investigation in the unit. 2. Supervised study for students to work individually or in small groups on solving problems which have been identified.	LAP 7A Pre-test Student (self) evaluation Observation Teacher, Classmates	TLS 1, 10, 11, 24, 29 7, 9, 10, 11
III. Plants for Food, Fiber and Building Material A. Vegetables B. Fruits C. Nuts	1. Students list vegetables and fruits that are effected by the seasons. Visit a commercial operation that produces greenhouse tomatoes out of season. Each student makes a written report on his findings.	Students report on field trips. Evaluate students prepares displays on effects of plants in our environment.	5, 15, 18, 19

TEACHING UNIT NO. 7 TITLE: Plants In Our Environment

TEACHING UNIT OBJECTIVES: 3. (cont'd) list plants most commonly utilized in recreational areas

Upon completion of this unit, the student will be able to:

4. describe ways plants may be cared for at school, at home, or in the community

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
D. Ocean Produced Plant Foods	2. Students do research to determine the value of seasons in the production of plant foods.	Oral test	
E. Trees as Sources of Building Material	3. Visit a canning or packing plant to observe the operation of the business.		
F. Grains			
G. Fiber Producing Plants	4. Visit a fiber producing plant such as a cotton gin or textile plant. Make a written report on observations.		
	5. Class discussion on the importance of plants in our ecology. Students prepare displays on effects of plants in our environment.		
	6. Visit local sawmill or pulpwood yard.		
IV. Diseases and Insects of Plants	1. Students make a collection of insect and disease injury to plants. Identify diseases and injuries through class study. Send samples to state plant disease and insect laboratory for identification. Arrive at decisions concerning monetary damage caused by insects and diseases annually. Students discuss occupations involved in activity.	Let student point out 5 or 6 different insects and disease damaged plants on the nature trail.	17
A. Plants			
B. Field Crops			
C. Vegetables			
D. Forests			
F. Pastures			

TEACHING UNIT NO. 7 TITLE: Plants In Our Environment

TEACHING UNIT OBJECTIVES: 4. (cont'd) describe ways plants may be cared for at school, at home, or in the community

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
V. Ornamental Plants A. Production B. Use for Aesthetics C. Scope of the Industry D. Occupational Opportunities E. Diseases and Insects	1. Arrange for each student to use greenhouse to root at least five different varieties of shrubs. 2. Field trip to observe the use of grass, shrubs and trees in home and highway beautification. Student estimates the land used in building a dual land highway and cloverleaf intersection. Compile the results through class discussion to arrive at the occupational opportunities that exist in this area. 3. Students inspect a greenhouse for insect and disease injury. Collect samples and specimens to identify in the classroom. Decide on control method. Apply control methods in greenhouse. 4. Send unidentified insect and diseases to state plant disease and insect laboratory for identification.	LAP 7B Pre-test Evaluate students "hands on" experiences LAP 7B Post-test Observation teacher, classmates	1, 6 TLS 10, 11 6, 15, 14
VI. Plants in Relation to Air, Soil, and Water A. Controlled Environment Types of Soil	1. Have students construct a terrarium to observe plants in a controlled environment. 2. Divide students into groups to grow plants in different types of soil to observe the effect of soil type on growth. 3. Student groups experiment with soils to determine the effect of rainfall	Students report on findings and/or experimental experiences. Student (self) evaluation	17, 8, 9, 11 TLS 17, 24, 2

TEACHING UNIT NO. 7 TITLE: Plants In Our Environment

TEACHING UNIT OBJECTIVES: 4. (cont'd) describe ways plants may be cared for at school, at home, or in the community

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	to protected soil surfaces. 4. Students experiment with soil and air temperatures effected by plant cover. Field trip to determine the temperature in a forested area compared to open areas. Take soil temperatures in barren area and compare with temperature in a plant covered area. Students report findings to class. 5. Each student collects a runoff water sample from a forested area, a barren field a field in row crops, and a pasture area following a heavy rain. Display these collections in glass jars to evaluate the value of each type of cover. Class discussion. Students write reports on findings.		

SUGGESTED RESOURCES

A. BOOKS:

1. American Resources, Darson, Rubin L., Prentice Hall, Inc., Englewood Cliffs, N. Y., 1969.
2. Handbook of Agricultural Occupations, Hoover, N. K., Interstate Printers and Publishers, Inc., Danville, Illinois, 1969.
3. That We May Live, Whitten, Jamie L., D. Van Nostrand Co., Inc., Princeton, N. J., 1967.
4. Forest and Forestry, Anderson and Smith, The Interstate Printers and Publishers, Inc., Danville, Illinois, 1970.
5. Agriculture in Our Lives, Krebs, A. H., Interstate Printers and Publishers, Danville Illinois, 1967.
6. Principles of Horticulture, Denisen, E. L., MacMillan, New York.
7. The World of Plant Life, Hylander, Clarence, The MacMillan Co., New York, 1956.
8. Adventures in Living Plants, Kurtz, E. B. and Allen, Chris, Arizona Press, Tucson, Arizona, 1965.
9. Plants and the Ecosystem, Billings, W. D., Wadsworth Publishing Co., Belmont, California, 1964.
10. Ecology of Populations, Boughey, A. S., The MacMillan Co., New York, 1968.
11. Plant Succession and Indicators, Clements, F. E., Hofner Publishing Co., New York, 1963.
12. Plants Today and Tomorrow, Hyde, Margaret O., Whittlesey House, New York, 1960.
13. Poisonous Plants of the U. S. and Canada, Kingsbury, John M., Prentice-Hall, Inc., New York.
14. The Plants, Went, F. W., Time, Inc., New York, 1963.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

15. Field Guide to Edible and Useful Wild Plants of North America, Chase, M., Nasco Nature Study Aids, Red Wing, Minn.

C. AUDIOVISUALS:

16. The Grassland, Encyclopedia Britannica Films, Inc., 1150 Willmette Ave., Willmette, Illinois 60091.
17. What is Ecology, Encyclopedia Britannica Films, Inc., 1150 Willmette Ave., Willmette, Illinois 60091.

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT No. 8 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Forests in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the occupations that utilize our forests for recreational purposes.
2. demonstrate skill in performing 10 tasks associated with recreational work in our forests.
3. list machines used in forest recreational areas.
4. describe ways the forest may be used as a recreational facility.

SUGGESTED TEACHING UNIT SEQUENCE: Based on student-teacher facility.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Student-teacher evaluation based on participation and demonstration of practical experiences, pre and post tests, and evaluation of written reports.

TEACHER COMPETENCY: Must have a working knowledge of forestry in U.S. and woods machinery operation and safety.

INSTRUCTIONAL MATERIALS:

Books: - (1) Forest and Forestry
(2) Rural Recreation for Profit
(3) Our Natural Resources

Visual: Filmstrip - North Carolina Forestry

GENERAL COMMENT: Student should participate in work experience, exploratory activities, FFA and additional learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas and businesses.

TEACHING UNIT NO. 8 TITLE: Forests In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify the occupations that utilize our forest for recreational purposes
2. demonstrate skill in performing 10 tasks associated with recreational work in our forest

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERILAS
I. Occupational Possibilities A. Overview of Occupations Related to Forest Ecology B. Nature of Each Occupation C. Personal Qualities D. Preparing for a Career E. Rewards and Satisfactions	1. Students list jobs related to forest at beginning of course and then list jobs at end of course. 2. Arrange for students to spend time with people engaged in forestry work to become familiar with job expectations. 3. Invite a forest ranger, game warden, and camp manager to discuss their occupations and related occupations with the students.	Evaluate Students check list in jobs in Forestry.	4, 7, 3, 5, 8 TLS 24
II. Problems in Forest Ecology A. Causes of Problems 1. insects and diseases 2. population, housing, highway use of land, fires B. Effects of Problems 1. health, ecosystems, aesthetics, recreation and economic costs	1. Students collect and identify the most common insects and diseases forest trees encounter and prepare a bulletin board display. Use appropriate materials from biology department. 2. Students determine the effects of population on forests by housing developments, highway use of land, and demands for wood products. 3. Students make a study of fire damage to forests by making a field trip to determine damage, prevention, causes,	LAP 8A Pre-test Student participating activity LAP 8A Post-test	LAP 8A 7, 1, 2, 3, 5

TEACHING UNIT NO. 8 TITLE: Forests In Our Environment

TEACHING UNIT OBJECTIVES: 2. (cont'd) demonstrate skill in performing 10 tasks associated with recreational work in our forest

Upon completion of this unit, the student will be able to:

3. list machines used in forest recreational areas

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
C. Solving Problems Related to Ecology 1. government programs, action groups, other	4. Students determine the effect forests have on health, conservation of soil and water, ecosystems, aesthetics, recreation and economic costs.		
	5. Students find out what the government and action groups are doing to preserve forests.	Evaluation of student reports	1, 3, 5
III. Machinery in Forest Ecology	1. Students become familiar with the types of machinery used in forestry occupations. Each student lists the commonly used machines and the uses of each.		4,7

TEACHING UNIT NO. 8 TITLE: Forests In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

4. describe ways the forest may be used as a recreational facility

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
IV. Human Relations	1. Students role play situations that may arise in dealing with the public; i.e., a disgruntled camper. Have one student play the role of the camp manager and one the camper.	Students skits LAP 8B Pre-test Student Participation	LAP 8B 6, 8
V. Forest Recreation	1. Instructor takes students camping, fishing, hiking, etc. to observe operation of parks and camps.	Teacher Observation Class observation reports	
	2. Instructor involves students in activities concerned with forestry and ecology. Suggested activities are: a. students design a forest recreation area to include camp sites, buildings, bath facilities, cooking and entertainment areas, trails, and landscaping. b. visit one improved forest and one unimproved forest to observe the effects on tree growth resulting from management. Students report on findings. c. each student have at least one exploratory experience in this unit.	LAP 8B Post-test Student (self) evaluation Students report on exploratory experience	

SUGGESTED RESOURCES

A. BOOKS:

1. Forests and Forestry, Anderson, David A. and Smith, William S., The Interstate Printers and Publishers, Inc., Danville, Ill., 1970.

2. Conserving American Resources, Parson, Ruben L., Prentice Hall, Inc. Englewood Cliffs, N. J., 1970.

3. Forestry Handbook, Forbes, Reginald D., The Ronald Press Company, New York, N.Y., 1

4. Handbook of Agricultural Occupations, Hoover, Norman K., Second Edition, The Interstate Printers and Publishers, Inc., Danville, Ill. 1969.

5. Our Natural Resources, McNall, P. E. and Kirchner, The Interstate Publishers and Printers, Inc., Danville, Ill., 1970.

6. Rural Recreation for Profit, Smith Clodus R., et. al., The Interstate Printers and Publishers, Danville, Ill., 1968.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

7. Outdoors U.S.A. U. S. Department of Agriculture, Superintendent of Documents, Washington, D. C., 1967 yearbook.

8. Exploring Occupations in the Natural Resources, U. S. Department of Health, Education and Welfare, Washington, D. C.

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WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01. 06

TEACHING UNIT NO. 9 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Construction for Outdoor Recreation

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. Compare the relationship between construction and occupations in the broad area of outdoor recreation and applied ecology.
2. list the different types of construction tasks to be performed.
3. demonstrate the use of tools needed in construction.
4. demonstrate basic skills needed in maintenance and minor repair of existing construction.
5. demonstrate skills needed in constructing outdoor recreational facilities and equipment.

SUGGESTED TEACHING UNIT SEQUENCE: Based on student-teacher conference.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 20-50 hours

EVALUATION: Daily evaluation based on attitudes and participation. Final evaluation based on student reaching stated unit objectives, pre and post tests.

TEACHER COMPETENCY: Basic construction skills in areas of carpentry, electrical wiring, plumbing and masonry and must have a working knowledge of hand and power tools used in outdoor construction and safety in their use.

INSTRUCTIONAL MATERIALS:

Books: - (1) Mechanics in Agriculture
(2) Handbook of Agricultural Occupations

Visual: Films - (1) America Goes Camping-16mm
(2) Big Country Camping

GENERAL COMMENT: Student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas and businesses.

TEACHING UNIT NO. 9 TITLE: Construction For Outdoor Recreation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. compare the relationship between construction and occupations in the area of outdoor recreation and applied ecology
2. list the different types of construction task to be performed

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Construction in Outdoor Recreation A. Camping Areas 1. scope and availability 2. kinds and description 3. skills needed	1. Assign students to visit recreational and camping areas to: a. make a list of the kinds of jobs b. make a list of the common repair jobs 2. The class compiles a chalkboard list and discusses the skills needed for each job.	LAP 9A Pre-test Student participation Teacher checklist LAP 9A Post-test	LAP 9A 1, 2, 3 TLS 20
B. Recreational Areas 1. scope and availability 2. kinds and description 3. skills needed	3. Invite a resource person to help the class to determine job requirements and skills. 4. Visit a recreational area to observe different types of construction.		
C. Golf Course 1. scope and availability 2. kinds and description 3. skills needed			
II. Carpentry A. Common Carpentry Terms B. Description and Use of Carpentry Hand To	1. Locate a house under construction in the community. Plan to visit the house at varying intervals of construction: a. to observe type of materials used b. to discuss carpentry terminology c. to discuss specifications d. to observe tools being u	LAP 9B Pre-test Observation and Oral reports Checklist Student (self) evaluation	LAP 9B TLS 1, 7, 9, 12, 15, 20, 21, 22, 27, 11, 17

TEACHING UNIT NO. 9 TITLE: Construction For Outdoor Recreation

TEACHING UNIT OBJECTIVES: 2. (cont'd) list the different types of construction task to be performed

Upon completion of this unit, the student will be able to:

3. demonstrate use of tools needed in construction

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
C. Common Carpentry Repair Jobs	2. Invite a carpenter to discuss with the class terms, tools, and repair jobs.	LAP 19B Pre-test LAP 19B Post-test	LAP 19B
	3. Students make a survey of common types of repair jobs in recreational and camping areas.		
	4. Students make a survey of types of common repair jobs at home and on the farm.		
	5. Discuss skills and tools needed for repair of jobs.		
	6. Students plan to do simple repair jobs at school.		
	7. Students plan to do repair jobs at home.		
	8. Plan and rebuild picnic tables for recreational areas.		
	9. Plan and build a picnic shelter in a recreational area.		
II. Masonry A. Common Masonry B. Description and Use of Masonry Tools C. Common Masonry	1. Locate a house under construction in the community. Plan to visit the house at varying intervals of construction: a. to observe type of materials used b. to discuss masonry terminology c. to observe tools being used d. to observe type of materials used	Student Participation Activities Student (self) evaluation	1, 2, 3, 5

TEACHING UNIT NO. 9 — TITLE: Construction For Outdoor Recreation

TEACHING UNIT OBJECTIVES:

3. (cont'd) demonstrate use of tools needed in construction

Upon completion of this unit, the student will be able to:

4. demonstrate basic skills needed in maintenance and minor repair of existing construction

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	2. Invite a resource person to discuss with the class masonry skills, terms, tools, and repair jobs.	Checklist	
	3. Visit a recreational area to observe types of masonry construction.		
	4. Plan and build outdoor fireplaces in a local camp or recreational area.		
	5. Students plan to do simple masonry repair jobs at school, home, or recreational areas.		
	6. Plan and build a cement walk.		
IV. Electrical Wiring A. Common Electrical Terms B. Description and Use of Electrician's Tools	1. Locate a house under construction in the community. Plan to visit the house in varying intervals of construction: a. to observe type of materials used b. to discuss electrical terminology c. to discuss specifications d. to observe tools being used	Observe and report either orally or written Student demonstration	1, 2, 3, 6
C. Common Electrical Repair Jobs	2. Invite an electrician to discuss with the class terms, tools, specifications, and repair jobs.		
	3. Students make a survey of the simple repair jobs in recreational and camping areas.		

TEACHING UNIT NO. 9 TITLE: Construction For Outdoor Recreation

TEACHING UNIT OBJECTIVES: 4. (cont'd) demonstrate basic skills needed in maintenance and minor repair of existing construction

Upon completion of this unit, the student will be able to:

5. demonstrate skills needed in constructing outdoor recreational facilities and equipment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	4. Students make a survey of types of simple repair jobs at home and on the farm.		
	5. Students plan to do a simple repair job.		
	6. Plan a simple electrical installation.		
V. Selecting and Using Paints	1. Discuss with the class paint terminology and equipment.	Student participation	
		Written tests and/or oral reports	1, 2, 3, 7
A. Common Kinds of Paints	2. Visit a paint supply dealer to observe different types of paint.		
B. Selecting and Caring			
C. Priming a New Surface	3. Invite a painter to discuss with the class selecting and applying paint.		
D. Applying Paint	4. Students make a survey on different types of paint maintenance jobs at school, home, and recreational areas.		
E. Painting Metal			
F. Painting Galvanized Roofing	5. Students plan to do simple paint jobs.		
G. Wood Preservatives	6. Discuss with the students the skills needed to replace broken windows.		
H. Painting Old Surfaces	7. Students plan to replace broken glass at home and school.		
I. Glazing			

TEACHING UNIT NO. 9 TITLE: Construction For Outdoor Recreation

TEACHING UNIT OBJECTIVES: 5. (cont'd) demonstrate skills needed in constructing outdoor recreational facilities and equipment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
VI. Selecting and Using Plumbing Equipment A. Maintenance of Plumbing Equipment B. Plumbing Terms C. Plumbing Repair Jobs	1. Locate a house under construction in the community. Plan to visit the house at varying intervals of construction: a. to observe types of materials used b. to discuss plumbing terminology c. to discuss specifications d. to observe tools being used		
	2. Invite a plumber to discuss with the class terms, tools, types of pipe to use and simple repair jobs.		
	3. Discuss with the class the skills needed to do simple plumbing and repair jobs.		
	4. Students plan to make a survey on types of plumbing repair jobs at school, home, farm, and recreational and camping areas.		
	5. Students plan to do a simple repair job (example, faucet repair).		
VII. Reading Blueprints A. Specifications	1. Visit a construction project to observe how blueprint and specifications are used.	Student participation Observation Teacher and classmates	1, 2, 3, 8
B. Dimensions C. Scale and Working Drawings	2. Invite a construction foreman to discuss with the class the interpretation of blueprints.		
D. Carpenter Symbols	3. Students plan and make scale and working drawings.		

TEACHING UNIT NO. 9 TITLE: Construction For Outdoor Recreation

TEACHING UNIT OBJECTIVE: 5. (cont'd) demonstrate skills needed in constructing outdoor recreational facilities and equipment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
E. Electrical Symbols	4. Discuss with the class how blueprints help in estimating the cost.		
F. Plumbing Symbols	5. Students plan to make a scale and working drawing of a simple project and estimate the cost.		
III. Selecting Building Materials	1. Visit a building supply dealer to observe kinds and types of building materials used in your community.	Observation and reports Checklist	1, 2, 3, 9
	2. Invite a supply dealer to discuss with the class kinds and types of building materials.		
	3. Visit a house under construction in your community to observe kinds and types of materials being used.		
	4. Visit camping and recreational areas to observe kinds and types of materials used.		
IX. Using a Land Level	1. Discuss with class skills needed in using a land level.	Student observe and report orally student demonstration checklist	1, 2, 3
	2. Students make a list of occupations which require the use of a land level.		
	3. Students use level to measure elevation.		
	4. Students use level to "lay off" a building site.	LAP 9B Post-test	
	5. Students use level to "lay off" a	Student Self Evaluation	

TEACHING UNIT NO. 9 TITLE: Construction For Outdoor Recreation

TEACHING UNIT OBJECTIVE: 5. (cont'd) demonstrate skills needed in constructing outdoor recreational facilities and equipment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	6. Students observe the use of the level on an actual construction job. 7. Invite a surveyor to discuss with the class the use of the level.		

SUGGESTED RESOURCES

A. BOOKS:

1. Farm Utility Buildings. American Association for Agricultural Engineering and Vocational Agriculture, Coordinator's Office, Agricultural Engineering Center, Athens, Georgia 30601, 1969. (Additional publications include: Planning Farm Fences, Electrical Terms, and Maintaining The Home Lighting and Wiring System.
2. Handbook of Agricultural Occupations. Hoover, Norman k., The Interstate Publishers and Printers, Inc., Danville, Ill., 1967.
3. Mechanics in Agriculture. Second Edition, Phipps, Lloyd J., The Interstate Publishers and Printers, Inc., Danville, Ill., 1967.

D. AGENCIES:

4. Local Carpenter
5. Masonry Contractor
6. Local Electrician
7. Local Paint Dealer
8. Plumbing Contractor
9. Building Materials Dealer

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 10 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Machinery Use in Outdoor Recreation

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the relationship between machinery and occupations in the broad area of outdoor recreation and applied ecology.
2. perform maintenance on one or more outdoor machines.
3. demonstrate the operation of one or more selected machines.
4. list the different types of machinery used in environmental occupations.
5. perform repairs on outdoor machines.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 20-50 hours

EVALUATION: Based on participation and individual ability to demonstrate the student's skills as stated in teaching unit objectives, pre and post tests, lab activities and lab performance.

TEACHER COMPETENCY: Basic knowledge and skills in equipment maintenance, repair, and safety in use.

INSTRUCTIONAL MATERIALS:

Books: - (1) Small Engines
(2) Safe Operation Outboard Motors
(3) Briggs and Stratton Repair Instruction III
(4) Modern Farm Power

Transparencies: - Transparency Masters - Small Engines Vol. I and II

GENERAL COMMENT: Student should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas and businesses.

TEACHING UNIT NO. 10 TITLE: Machinery Use in Outdoor Recreation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify the relationship between machinery and occupations in the broad area of outdoor recreation and applied ecology

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Machines and Outdoor Recreation Occupations A. Jobs in Outdoor Recreation where Machines are Used	1. Divide class into committees to list jobs where use of machinery is necessary. Committee breakdown in areas of boating, camping, parks, and recreation, wildlife, hunting and fishing, golf, and others important to local area.	Teacher observation of student participation Students lists are evaluated by teacher and students. Written or oral tests	16
B. Kinds of Machines Used in Outdoor Recreation C. Hand Tool Use and Maintenance	2. Each committee will develop a list of hand tools and machines used and will present this to class to compile a master list of the different machines and tools used.		
	3. Field trips to local recreation facilities such as a golf course, boat yard, wildlife preserve, campground, forest area, etc. to see machines and talk with operators.		
	4. Instructor demonstrated proper use and care of hand tools.		
	5. Show ABC's of Hand Tools film.		

TEACHING UNIT NO. 10 TITLE: Machinery Use in Outdoor Recreation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

2. perform maintenance on one or more outdoor machines.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
II. Operating Turf and Lawn Machines	1. Show pictures of different types of turf and lawn machines and discuss advantages and disadvantages of each.	LAP 10A and 10B Pre-test Teacher observation of student participation.	2, 3, 4, 6, 7, 8, 10, 11, LAP 10A LAP 10B
A. Mowers B. Aerators	2. Field trip to golf course or other facility where different types of turf and lawn machines might be found.	Students performance of skills in operating equipment.	
C. Verticutters	3. Instructor discusses safe equipment operation.	Written or oral tests	
D. Four-Cycle Engine Principles of Operation 1. fuel system 2. valve systems 3. electrical system	4. Students collect articles from newspapers about injuries caused by lawn and turf machine operators.	Teacher evaluation of students repair and maintenance of four cycle engines.	
4. compression, pistons, cam shafts and crank shaft	5. Demonstrate operation of lawn and turf equipment. Students start and operate different types of equipment.	LAP 10A and 10B Post-test	
5. measuring devices used in repairing four cycle gasoline engines	6. Instructor demonstrates with charts, filmstrips or cut away model the four cycles of the gasoline engine.		14
6. lubrication of four cycle gasoline engine	7. Each student brings to class an old inoperable lawn mower to disassmeble and repair.		
	8. Instructor demonstrates and discusses different systems of four cycle gasoline engines, by use of films, slides, charts, transparencies, models, or actual engines.		
	9. Instructor discusses use [illegible] feeler gauges,		

TEACHING UNIT NO. 10   TITLE: Machinery Use in Outdoor Recreation

TEACHING UNIT OBJECTIVES:

2. (cont'd) perform maintenance on one or more outdoor machines

Upon completion of this unit, the student will be able to:

3. demonstrate the operation of one or more selected machines
4. list the different types of machinery used in environmental occupations.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	10. Each student reassembles his lawn mower engine and replaces needed parts; and then gets it in good running condition.		
III. Chain Saws A. Use of Chain Saws	1. Students saw pole in half with a manual bow or cross cut saw then the instructor saws pole in two parts with chain saw.	Teacher and student evaluation of lists made by students.	
B. Safety C. Chain Saw Operation	2. Students develop list of uses of chain saw in outdoor areas.	Teacher observation of student participation. Written or oral tests.	9, 10, 11, 12
D. Chain Care and Sharpening	3. Students develop list of safety rules for chain saw use.	Students performance of skills.	
	4. Instructor demonstrates start up and correct method of operation. Each student starts up chain saw and cuts a pole.	Student self evaluation.	
	5. Instructor demonstrates sharpening. Students sharpen several teeth on chain.		
IV. Spray Equipment	1. Instructor discusses safety in use of pesticides.	Student participation. Written tests.	13
A. Safety Rules for Using Pesticides	2. Show films, filmstrips and transparencies on safe use of pesticides.	Student performance of skills.	LAP 22
B. Types of Hand and Power Sprayers C. Spraying Techniques	3. Have containers on hand so students can read labels.	LAP 22 Pre-test. Students ability to caibrate	

TEACHING UNIT NO. 10 TITLE: Machinery Use in Outdoor Recreation

TEACHING UNIT OBJECTIVES: 4. (cont'd) list the different types of machinery used in environmental occupations.

Upon completion of this unit, the student will be able to:

5. perform repairs on outdoor machines.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
D. Mixing Pesticides and Calibrating Spray Equipment	5. Collect newspaper articles about accidents involving pesticides.	LAP 22 Post-test	
	6. Show students types of hand sprayers, dusters and nozzles.		
	7. Visit farm equipment dealer to see different types of power sprays and dusting equipment.		
	8. Visit farms, golf courses, mosquito control units, etc. and permit students to observe spraying and dusting operation.		
	9. Instructor demonstrates correct spraying and dusting techniques, and students do actual spraying.		
	10. Instructor discusses methods of calibration of spray equipment.		
	11. Students work out problems in calibrating hand and power sprayers.		
V. Golf Carts A. Types of Golf Carts B. Safe Operation of Golf Carts	1. Class visits local golf course where golf pro demonstrates types of golf carts, discusses safety regulations, and shows how to operate each type of cart.	Written or oral tests Student performance of skills Teacher observation of participation. Student self evaluation.	10, 11
	2. Students operate golf carts and demonstrate safety rules.		
	3. Students observe rechargi[illegible] station.		

TEACHING UNIT NO. 10 TITLE: Machinery Use in Outdoor Recreation

TEACHING UNIT OBJECTIVES: 5. (cont'd) perform repairs on outdoor machines.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
C. Operation of Golf Carts 1. electric 2. gasoline	4. Instructor demonstrates golf cart maintenance to students on carts borrowed from local golf course.		
D. Recharging Electric Carts	5. Students perform maintenance operations on golf carts.		
E. Golf Cart Maintenance			
VI. Irrigation Systems	1. Students develop lists of sources of water for irrigation.	Teacher evaluation of lists	
A. Sources of Water		Written or oral tests.	
B. Irrigation Equipment	2. Instructor discusses pumps and pump capacity.	Student participation.	1, 10, 11
	3. Visit supply house to see types of pumps.		
	4. Field trip to various irrigation installations in community.		
	5. Guest speaker from power company, plumbing supply house, or equipment company.		
	6. Instructor uses films, slides, charts, to illustrate types of irrigation equipment.		
VII. Heavy Equipment	1. Refer to original machinery lists made by students.	Student participation.	
A. Use of Heavy Equipment in Outdoor Recreation	2. Field trips to heavy equipment machinery dealers.	Written or oral tests.	

TEACHING UNIT NO. 10 TITLE: Machinery Use in Outdoor Recreation

TEACHING UNIT OBJECTIVES: 5. (cont'd) perform repairs on outdoor machines.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHINQUES	SUGGESTED RESOURCE MATERIALS
	3. Assign students to interview operators of heavy equipment in community and report to class on the interview.		
	4. Use visual aids to show students various types of heavy equipment.		
	5. Visit construction or highway project where heavy equipment is operating.		
III. Outboard Motors	1. Field trip to local dealers in outboard motors.	LAP 10C Pre-test 17C	12
A. Types of Outboard Motors	2. Class discussion related to which type and size of outboard motor is best for particular applications.	Teacher and student evaluation of students lists	LAP 10C, 17C
B. Safety		Teacher observation of student participation	
C. Operation of Outboard Motors	3. Class develops list of safety rules pertaining to outboard motor operation	Written or oral tests	
D. Two Cycle Gasoline Engines Principle of Operation 1. fuel system 2. valve system 3. electrical systems 4. compression, pistons and crank shaft 5. lubrication of two cycle gasoline engine	4. Instructor starts motor and demonstrates operation of motor. Each student operates motor.	Student performance of skills LAP 10C Post-test 17C	
	5. Instructor takes groups out in outboard motor boat and each student operates boat.		
	6. Instructor demonstrates with charts, filmstrips, or cut away model of the two cycle engine.		
	7. Field trip to chain saw or outboard motor repair shop.		

TEACHING UNIT NO. 10 TITLE: Machinery Use in Outdoor Recreation

TEACHING UNIT OBJECTIVES: 5. (cont'd) perform repairs on outdoor machines.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	8. Instructor discusses and demonstrates different systems of two cycle gasoline engine. Use films, filmstrips, charts, slides, transparencies, models, or real engines. 9. Instructor discusses with students various mixtures of gasoline and oil.		

SUGGESTED RESOURCES

A. BOOKS:

1. Modern Farm Power. Promersberger, W. J. and Bishop, F. E., Prentice-Hall, Inc. Englewood Cliffs, N. J.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

2. Small Engines. American Associations for Agricultural Engineering and Vocational Agriculture. Agricultural Engineering Center, Volumes I and II, May, 1961, Athens, Georgia 30601.

3. Small Gasoline Engines. The Department of Agricultural Education, The Pennsylvania State University, College of Agriculture, Department of Agricultural Education, University Park, Pennsylvania 16802.

4. General Theories of Operation. Briggs and Stratton Corporation, Milwaukee, Wisconsin.

5. Briggs and Stratton Repair Instructions III. Briggs and Stratton Corporation, Milwaukee, Wisconsin.

6. Supplement to Briggs and Stratton Repair Instructions III. Briggs and Stratton Corporation, Milwaukee, Wisconsin.

7. 4-H Small Engines Unit II Leaders Guide, N. C. State Extension Service, Raleigh, N. C.

8. 4-H Small Engines Unit I Small Engine Power. N. C. State Extension Service, Raleigh, N. C.

9. 4-H Small Engines Unit II Two Stroke Cycle Engines. N. C. State Extension Service, Raleigh, N. C.

10. Yearly Catalog. Porter Brothers, Shelby, N. C.

11. Yearly Catalog. E. J. Smith Co., Charlotte, N. C.

12. Safe Operation of Outboard Motors. Outboard Marine Corporation, Milwaukee, Wisconsin.

13. N. C. Pesticides Handbook.

14. Small Engine Care and Operation, Vol 1 and 2, Transparency Masters, 172 masters.

C. AUDIOVISUALS:

15. Small Engines Volumes I and II, Transparency Masters. American Association for Agricultural Engineering and Vocational Agriculture, Coordinator's Office, Agricultural Engineering Center, Athens, Georgia 30601.

16. ABC's Of Hand Tools Film, General Motors Film Library, General Motors Building, Detroit, Mich. 48202.

PART II

OPTIONAL TEACHING UNITS

(Select units most appropriate to local situation)

01 - 11/12-11 -74

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 11 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Wildlife Populations

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the scope and kinds of wildlife occupations.
2. list the relationship of wildlife to man and his environment.
3. identify the wide range of wildlife species found in North Carolina.
4. determine the relationship of wildlife to its environment.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Teacher and student evaluation based on daily participation and practical experiences including supervised occupational experiences, pre and post tests, lab work and self appraisal.

TEACHER COMPETENCY: Must have a background or working knowledge in North Carolina wildlife as wildlife game protector or wildlife biologist.

INSTRUCTIONAL MATERIALS:

Books: - (1) Principles of Game Management
(2) Outdoor United States America

Visuals: Films - (1) Patterns of Wildlife
(2) Wildlife Babies

Filmstrips - (1) Wildlife Conservation Today
(2) The Woods at Home

GENERAL COMMENT: Each student should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 11 TITLE: Wildlife Populations

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify the scope and kinds of wildlife occupations
2. list the relationship of wildlife to man and his environment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities	1. Each student to prepare a list of wildlife occupations.	Teacher-student evaluation of participation in daily activities.	13, 14, 17,4, 10, 9, 8
A. Scope and Availability B. Kinds and Description	2. Have class compile a list and discuss each in terms of education, experience and other qualities needed in each occupation.	Teacher-student evaluation of SOE program	
C. Requirements for Entry and Advancement 1. education 2. experience 3. physical 4. others	3. Invite wildlife biologist to speak and to demonstrate some of the tools of his trade to the class.		
II. Importance of Wildlife A. Balance of Nature	1. Show and discuss transparencies on balance of nature.		8, 2, 3, 9
B. Recreational 1. hunting 2. fishing 3. bird watching	2. List on chalkboard or transparency students' answers to "What are our wildlife resources?"		
C. Economic 1. related income 2. job income 3. commercial income D. Aesthetic	3. Have class discussion on economic value of wildlife and related businesses.		

TEACHING UNIT NO. 11 TITLE: Wildlife Populations

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. identify the wide range of wildlife species found in North Carolina
4. determine the relationship of wildlife to it's environment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Species of Wildlife Common to Area	1. Prepare a list of all wildlife that students have seen in the school district.	LAP 19-A Pre-test	LAP 19A
A. Mammals in Local Area		LAP 19 A Post-test	TLS 25 and 26 11
B. Birds in Local Area	2. Show pictures of different wildlife and ask students what different names they are called.		
C. Reptiles in Local Area	3. Have students make a list of the habitat requirements for various wildlife species.		
D. Disappearing Species in Local Area			
E. Wildlife Terms in Local Area			
IV. Relationship of Wildlife to Environment	1. Students prepare a demonstration showing oxygen-carbon dioxide cycle and explain it to the other class members.	Student self evaluation LAP 11A, 11B	8, 6, 7, 2, 1, 12, 5
A. Food Chain			LAP 11A, 11B
B. Scavengers	2. Invite wildlife biologist to present program on endangered species.	Pre-test LAP 11A, 11B Post-test	
C. Role in Natural Cycles 1. oxygen-carbon dioxide 2. nitrogen 3. others	3. Have each student design plans for revitalizing some endangered species or plans to prevent extinction of some species.	Written and/or oral reports Observation teacher and student	
D. Species Endangered by Pollution			

SUGGESTED RESOURCES

A. BOOKS:

1. Conserving American Resources. Parson, Ruben, Pretice Hall, Inc., Englewood Cliffs, N. J., 1964.

2. Our Natural Resources, McNall, P. E. and Kirchner, Harry B., Third Edition, The Interstate Publishers and Printers, Inc., 1970.

3. Outdoors U.S.A. U. S. Department of Agriculture, Superintendent of Documents, Washington, D. C. 1967 yearbook.

4. Handbook on Agricultural Occupations. Hoover, Norman K., Second Edition, The Interstate Publishers and Printers, Inc., Danville, Ill., 1969.

5. Understanding Ecology, Elizabeth Billington, Fredrick Warne and Co., New York, N.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

6. Principles of Game Management, Madson, John and Kozicky, E., Olin Mathieson Chemical Corp., East Alton, Ill., 1962. (Also see Careers in Wildlife Conservati

7. Our Wildlife Neighbors, North Carolina Wildlife Resources Commission, Conservatio and Development Division, Raleigh, N. C.

8. Farmers Bulletin No. 2035. "Making Land Produce Wildlife," U. S. Department of Agriculture, Superintendent of Documnets, Washington, D. C.

9. Wildlife in North Carolina, N. C. Wildlife Resources Commission, Raleigh, N. C.

10. Careers In Wildlife Conservation, Source: Conservation Dept., Olin Mathison Chemical Co., East Alton, Illinois.

C. AUDIOVISUALS:

11. Familiar Animals and Thier Families, Slide Filmset, Source: SVE, 1345 Diversey Parkway, Chicago, Ill. 60614.

12. Why Animals Live Where They Live. Slide Filmset, Source: Eye Gate, 146-01 Archer Ave., Jamaiea, N.Y. 11435.

D. AGENCIES:

13. N. C. Wildlife Commission.

14. Local Forest Ranger.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 12 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Wildlife Management

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify occupational possibilities in wildlife management.
2. describe man's responsibilities needed to produce wildlife.
3. compare the relationship of wildlife management to the environment.
4. list the responsibilities of each citizen in observing our game laws.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 10-20 hours

EVALUATION: Teacher and student evaluation based on daily participation and practical experiences including supervised occupation experiences, and pre and post tests.

TEACHER COMPETENCY: Working knowledge of wildlife, occupational opportunities and N.C. Game Laws as wildlife game protector and biologist.

INSTRUCTIONAL MATERIALS:

Books: - (1) Making Land Produce Wildlife
(2) Careers in Wildlife Occupations

Visuals: Filmstrip - Giving Our Wildlife A Chance

Film - We Share This Land

GENERAL COMMENT: Student should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 12 TITLE: Wildlife Management

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify occupational possibilities in wildlife management
2. describe man's responsibilities needed to produce wildlife.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities	1. Arrange for a game warden to visit and talk with the class about his job and others related to this field.	LAP 11A Pre-test	2
A. Scope and Availability		Report on experiences in this unit.	LAP 11A
B. Kinds and Description	2. Have students fill out FFA proficiency award application for fish and wildlife management.	LAP 11A Post-test	
C. Requirements for Entry and Advancement 1. education 2. experience 3. physical 4. others	3. Have students watch TV programs dealing with wildlife.	Written test	
II. Wildlife Identification, Habitat and Reproduction	1. Take the class outside and look for signs of wildlife species that are prevalent to the school area.	LAP 13 A Pre-test LAP 13 B Post-test	6, 17, 3 LAP 13A
A. Game Mammals	2. Visit a wildlife preserve in the area.	Participation (student)	
B. Furbearing Mammals			
C. Upland Game Birds			
D. Migratory Game Birds			
E. Miscellaneous Wildlife 1. game birds of N.C. 2. non-game birds of N. C. 3. mammals of N. C.			

TEACHING UNIT NO. 12 TITLE: Wildlife Management

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. compare the relationship of wildlife management to the environment

4. list the responsibilities of each citizen in observing our game laws

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Principles of Game Management	1. Visit national or state park and see how wildlife is protected.	LAP 11B Pre-test LAP 11B Post-test	5, 1, 3 TLS 25, 21, 22
A. Importance of Hunting Regulations	2. Visit private game refuge and observe the operation.	Observation teacher, classmates	LAP 11B
B. Predator Control	3. Visit local game release enterprise and observe the operation.		
C. Game Refuge			
D. Stocking	4. Invite local wildlife agent to discuss game release program in the area.		
E. Habitat Restoration	5. Invite wildlife biologist to visit and talk about species that are prevalent to the area.		
IV. Using Land to Produce Useful Wildlife	1. Establish wildlife cover on school property.	LAP 12 Pre-test Report on experiences	4, 5, 6, 1, 3 LAP 12
A. Cropland practices that are helpful and harmful to wildlife	2. Acquire seed to distribute to students for plantings at their homes.	LAP 12 Post-test	
B. Pasture land practices that are helpful and harmful to wildlife	3. Invite soil conservationist to talk to class about land use practices used in one's locale.		
C. Range land practices that are helpful and harmful to wildlife			
D. Woodland practices that are helpful and			

TEACHING UNIT NO 12 TITLE: Wildlife Management

TEACHING UNIT OBJECTIVES: 4. (cont'd) list the responsibilities of each citizen in observing our game laws

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
harmful to wildlife E. Wildlife Land 1. definition 2. types			

SUGGESTED RESOURCES

A. BOOKS:

1. Conserving American Resources. Parson, Ruben L., Prentice Hall, Inc., Englewood Cliffs, N. J., 1964.
2. Handbook of Agricultural Occupations. Hoover, Norman K., The Interstate Publishers and Printers, Inc., 1969.
3. Our Natural Resources. McNall, P. E. and Kircher, Harry B., The Interstate Publishers and Printers, Inc., 1970.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

4. Making Land Produce Wildlife. USDA, Superintendent of Document, Washington, D. C., 1965.
5. Principles of Game Management. Madson, John and Kozicky, E., Olin Mathieson Chemical Corp., East Alton, Ill., 1962.
6. Our Wildlife Neighbors., North Carolina Wildlife Resources Commission, Conservation and Development Division, Raleigh, N. C.
7. Careers in Wildlife Occupations. Madson, John and Kozicky, E., Olin Mathieson Chemical Corp., East Alton, Ill., 1967.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 13 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Harvesting Game Species

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. compare the relationship of harvesting game species to overall wildlife populations and our environment.
2. identify the job opportunities in hunting and related areas.
3. list proper hunter safety attitudes and procedures.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 10-20 hours

EVALUATION: Daily, based on participation and attitudes. Final evaluation based on the degree of proficiency shown by each student in stated unit objectives, through pre and post tests.

TEACHER COMPETENCY: National Rifle Association (NRA) Certified: knowledgeable in hunting laws, gun safety, hunting dogs, and trapping skills.

INSTRUCTIONAL MATERIALS:

Books:	- (1) Rural Recreation for Profit (2) North Carolina Statutes on Game, Fish and Boat Laws
Magazines:	- North Carolina Wildlife
Visuals: Films	- (1) The Story of the Mourning Dove (2) Unusual Hunting in North Carolina

GENERAL COMMENT: Each Student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning activities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 13 TITLE: Harvesting Game Species

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. compare the relationship of harvesting game species to overall wildlife populations and our environment
2. identify the job opportunities in hunting and related areas

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Relationship of Game Harvesting to Overall Wildlife Population	1. Classroom study of N. C. wildlife commission reports on game population (study of deer populations in Bertie and Halifax will be good).	LAPS 11A, 11B, and 12 Pre-test Written and oral tests	5, 6, 11, 12, 22, 23, and 27 LAP 11a, 11B, 12
A. Population Potential of Game Habitat 1. deer 2. quail 3. doves 4. rabbits 5. muskrat, mink, other	2. Visit a local area known to have good population of some species to study the environmental conditions causing this population.	Written reports Teacher observation of student participation Oral reports	
B. Biotic Potential of Game Species	3. Have each student visit an area of his choice and determine the population potential of this area (game species may also be of his choice as an exploratory experience).	LAPS 11A, 11B, and 12 Post-test	
C. Effects of Overpopulation of Game Species	4. Invite wildlife protector or other wildlife resources commission agent to discuss his work with class.		
D. Effects of Uncontrolled Harvesting	5. Show films - "The Wild Turkey", "Calling All Ducks" and "A Way of Life" in this unit.		
II. Job Opportunities in Hunting and Related Areas	1. Arrange to have guidance department materials available for students to study job opportunities.	Oral or written tests Teacher observation of student participation	6, 8, 11, 12, 17, 18
A. Scope and Availability B. Kinds and Descriptions C. R irements for	2. Each student should visit or interview a competent firearms salesman or gunsmith.	Oral or written reports	

TEACHING UNIT NO. 13 TITLE: Harvesting Game Species

TEACHING UNIT OBJECTIVES: 2. (cont'd) identify the job opportunities in hunting and related areas

Upon completion of this unit, the student will be able to:

3. list proper hunter safety attitudes and procedures

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
Entry and Advancement 1. educational 2. experience 3. physical 4. other			
II. Safe Hunting and Gun Handling	1. Study accident reports and other hunting accident leaflets from N. C. Wildlife Commission and discuss in class.	Teacher evaluation of student participation	5, 6, 7, 16, 19, 25, 26
A. Hunting Accidents 1. types of accidents 2. causes of accidents B. Gun Handling 1. rifles 2. shotguns	2. Secure hunter safety course material planned by N. R. A. and provided by N. C. Wildlife Commission. This is a self-explanatory study which is action oriented. This will include a supply of teaching materials and suggested actions.	Written and oral tests Students performance in using equipment Oral reports Student (self) evaluation	
C. Proper Equipment for Different Kinds of Hunting	3. Provide a rifle range and have each student demonstrate safe gun handling and firing attitudes and procedures with some degree of accuracy.	Observation teacher, classmates	
	4. Secure a clay pigeon trap (hand or stationary) and have each student demonstrate safe gun handling with the shotgun at a moving target (use local skeet range if available).		
	5. Have a gun company representative demonstrate types of ammunition and		

TEACHING UNIT NO. 13 TITLE: Harvesting Game Species

TEACHING UNIT OBJECTIVES: 3. (cont'd) list proper hunter safety attitudes and procedures

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	6. Provide an obstacle course and have each student demonstrate proper gun handling in various situations.		
	7. Have students prepare a bulletin board depicting arms and ammunition and safe hunting.		
	8. Show films "Teaching Gun Safety in the Public Schools," "Sure as Shooting" and "Trigger Happy Harry".		
IV. Hunting Laws and Regulations	1. Have group of students prepare a display of game species of N. C. and identify.	Teacher evaluation of student participation	1, 11, 12, 20, 21, 22
A. Game Animals 1. identifying 2. open seasons 3. licensing and permits	2. Invite game warden to discuss game laws and licenses with class.	Oral and written tests	
	3. Invite a wildlife biologist to discuss game species.	Oral and written reports	
B. Upland Game Birds 1. identify 2. open seasons 3. licensing and permits	4. Exhibits of mounted specimens from N. C. Museum of Natural History.		
	5. Show films "Calling All Ducks", "The White Tail Buck" and " Know your Ducks".		
C. Migratory Wild Fowl 1. identify 2. open seasons 3. licensing and permits			

TEACHING UNIT NO. 13 TITLE: Harvesting Game Species

TEACHING UNIT OBJECTIVES: 3. (cont d) list proper hunter safety attitudes and procedures

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
V. Shooting Preserves and Hunting Areas	1. Visit a commercial shooting preserve or hunting area if available.		8, 1, 15
A. Shooting in Commercial Preserves	2. Have each student visit a shooting preserve or private gun club on a hunt as an exploratory experience.		
B. Commercial Hunting Areas			
C. Private Shooting Preserves and Gun Clubs	3. Have a member of North Carolina Wildlife Resources Commission explain and discuss facilities and game management programs.		
VI. Hunting Dogs	1. Have a committee of students prepare a display of kinds of dogs and explain the use of each in hunting.	Oral and written reports Teacher evaluation of student participation	8, 2, 3, 4, 10, 14, 24
A. Bird Dogs 1. pointers 2. setters 3. retrievers	2. Arrange a visit to a dog trainer, or student who has some kind of hunting dogs and study his experiences and economic possibilities.		
B. Rabbit Hounds			
C. Fox Hounds	3. Encourage each student to go on at least one hunt involving dogs and relate his experiences.		
D. Raccoon and Opossum Hounds			
E. Squirrel Dogs	4. Have local veterinarian discuss problems encountered in producing and using hunting dogs.		
F. Deer Dogs			
G. Bear Dogs	5. Have students examine ads in outdoor magazines to help determine demand for hunting dogs and their value.		
	6. Show film "Bay at the Moon."		

TEACHING UNIT NO. 13 TITLE: Harvesting Game Species

TEACHING UNIT OBJECTIVES: 3. (cont'd) list proper hunter safety attitudes and procedures

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
VII. Trapping	1. Make a study of fur bearing animals of the area.	Oral and written reports	8, 9, 13
A. Exploring Local Possibilities 1. fur bearing animals in area 2. markets for furs	2. Each boy to locate an area where fur bearing species may be found and report in class.	Oral and written tests Teacher observation and evaluation of student participation.	
B. Animal Traps	3. Take the class to a local trapper to observe the techniques used in skinning and preparing the pelts.	Teacher observation and evaluation of performance skills of students.	
C. Furs 1. skinning animals 2. pelting	4. Have a local trapper demonstrate the proper setting of traps for different fur-bearers.		
	5. Encourage students to trap fur bearing animals and market furs.		

SUGGESTED RESOURCES

A. BOOKS:

1. Rural Recreation for Profit. Smith, C. R., Partain, Champlin, The Interstate Publishers and Printers, Inc., 1968.

2. Training Your Own Bird Dogs, Henry P. Davis, available from Bill Bootman and Co., Bainbridge, Ohio 45612.

3. The Complete Book of Dog Care, Leon F. Whitney, available from Bill Bootman and Co. Bainbridge, Ohio 45612.

4. Coonhunter's Handbook, L. F. Whitney and A. B. Underwood, available from Bill Bootman and Co., Bainbridge, Ohio 45612.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

5. N. C. Wildlife Magazine. North Carolina Wildlife Commission, Raleigh, N. C.

6. N. R. A. Safe Hunter Course. N. C. Wildlife Resource Commission, Raleigh, N. C.

7. Shooters Bible. Stoeger Arms Corp., 55 Ruth Court, South Hackensack, N. J.

8. North Carolina Statutes on Game, Fish, and Boat Laws. N. C. Wildlife Commission, Raleigh, N. C.

9. Hecter's Catalog - current edition, Hecters Inc., Rt. 2, Mitchell, South Dakota 57301.

10. This is the Beagle, George D. Whitney, available from Bill Bootman and Co., Bainbridge, Ohio 45612.

C. AUDIOVISUALS:

11. "Teaching Gun Safety in the Public Schools" - Daisy Manufactoring Co., Rogers, Ark. 7256 att: Mr. Jack Raed

12. "Calling All Ducks" - Modern Talking Picture Service Inc.

13. "The White Tail Buck" - 3 East 54th St., New York, N. Y. 10022.

14. "Know Your Ducks" - N. C. Wildlife Commission, Div. of Ed., 325 N. Salisbury St., Raleigh, N. C. 27611.

15. "The Wild Turkey" - N. C. Wildlife Commission, Div. of Ed. , 325 N. Salisbury St., Raleigh, N. C. 27611.

16. "Bay at the Moon" - N. C. Wildlife Commission, Div. of Ed., 325 N. Salisbury St., Raleigh, N. C. 27611

17. "Trigger Happy Harry" - N. C. Wildlife Commission, Div. of Ed., 325 N. Salisbury S Raleigh, N. C. 27611.

18. "Sure as Shooting" - N. C. Wildlife Commission, Div. of Ed., 325 N. Salisbury St., Raleigh, N. C. 27611.

19. "A Way of Life" - N. C. Wildlife Commission, Div. of Ed., 325 N. Salisbury St., Raleigh, N. C. 27611.

continued

D. AGENCIES:

20. Game Warden
21. Wildlife Biologist
22. Local Trapper
23. Local Dog Trainer
24. Shooting Preserve Operator
25. Hunter Safety Instructor
26. Gunsmith
27. Competent firearms salesman

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WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 14 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Golf Course Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. compare the scope of golf in North Carolina and home county in economical terms.
2. identify the jobs that are available and what is required in each job.
3. list skills which are needed in each job.
4. list steps in building and maintaining a golf green.
5. identify the abilities needed by golf course managers.
6. list the equipment needed for golf course maintenance.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Teacher Approval

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Daily evaluation of student progress toward stated objectives. Final evaluation based on total progress toward objectives relative to student needs, and through pre and post tests.

TEACHER COMPETENCY: Background or training in personnel and business management. A talking and understanding of golf vocabulary. Some basic skills in use of golf clubs and knowledgeable in turf and turf management.

INSTRUCTIONAL MATERIALS:

Bulletin/Books: - (1) Turf Management
(2) Rules of Golf
(3) Establishing and Caring for Lawns and Turf

Visual: Film - Blades of Green

Handbook: - (1) Turfgrass, Maintenance and Establishment, A Student Handbook
(2) Turfgrass, Maintenance and Establishment, A Teacher's Manual

GENERAL COMMENT: Student should participate in work experience, exploratory experiences, FFA and additional practical learning activities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses. Some specific activities which might be used are listed under teaching learning experiences.

TEACHING UNIT NO. 14 TITLE: Golf Course Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. compare the scope of golf in North Carolina and home counties in economical terms.
2. identify the jobs that are available and what is required in each job.
3. list skills which are needed in each job.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Opportunities Available	1. Students form committees a. one committee to determine the number of golf courses in N. C. and local area b. one committee to determine the amount of money spent each year on golf in N. C. and local area c. one committee to determine the kinds of jobs available in the golfing industry in N. C. and the local area.	Teacher evaluation of student participation TLS-17 Pre-test Observation teacher, classmates	1, 7, 10 TLS 17
	2. Committees present information to class and compile master list of job opportunities.		
II. Golf Course Facilities	1. Take a field trip to a golf course a. ask the golf pro to point out the different component parts explaining the necessity of each b. students observe golfers to see what facilities the game requires c. students prepare lists of different structures with description of each.	Teacher evaluation of oral or written reports	5, 8 TLS 17
III. Turf Management	1. Students prepare lists of all grasses used on golf courses - field trip to local course.	Written test Teacher evaluation of oral and written reports.	3, 5, 9, 4
	2. Students build turf plots.	Teacher evaluation of student participation.	
	3. Students chart properties of each grass which determine suitability for golf.		

TEACHING UNIT NO. 14 TITLE: Golf Course Management and Operation

TEACHING UNIT OBJECTIVES:

3. (cont'd) list skills which are needed in each job
4. list steps in building and maintaining a golf green.
5. identify the abilities needed by golf course managers.
6. list the equipment needed for golf course maintenance.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	4. Students build and maintain golf green.		
	5. Students individually or in small groups observe greens superintendent and workers charting activities for 1 week.		
IV. Shrub Management	1. Students visit golf course and list trees and shrubs growing there.	Teacher observation of student participation	2,5,9
	2. Students establish and maintain horticulture display area.		
V. Equipment	1. Students visit golf course listing equipment used.		
	2. Students use LAP 10A Operation of Turf and Lawn Mowers.		6, 11
	3. Students use LAP 10B Maintenance of Turf and Lawn Mowers.		
	4. Students use LAP 14B Golf Course Equipment.		

SUGGESTED RESOURCES

A. BOOKS:

1. Rural Recreation for Profit. Smith, D. R., Partain, Champlin, The Interstate Printers and Publishers, Inc., Danville, Ill., 1968.

2. Principles of Horticulture. Denisen, E.L., McMillan, New York.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

3. Turf Maintenance. The Pennsylvania State University, College of Agriculture, Agricultural Experiment Station, Department of Agricultural Education, University Park, Penn.

4. Turf Management Handbook. Sprague, H. B. Interstate, Danville, Illinois.

5. The Establishment and Maintenance of Golf Greens. The United States Golf Association.

6. Yearly Catalog. Porter Bros, Shelby, N. C.

7. North Carolina Golf State, U.S.A. Department of Conservation and Development, Travel and Promotion Division, Raleigh, N. C.

8. Rules of Golf. United States Golf Association, Merchandise Mart, Chicago, Illinois.

9. Suggestions and Procedures for Developing Teaching-Learning Stations, SDPI, Raleigh, N. C.

D. AGENCIES:

10. Local Golf Pro.

11. Local Sports Equipment Dealership.

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WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 15 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Commercial and Recreational Fishing

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. compare the scope of commercial and recreational fishing in state and local county in terms of enterprises, dollars, and occupations.
2. compare the relationship of marine life to our environment and the natural balances necessary for the growth of commercial and sport species.
3. identify gear and equipment needed in commercial and recreational fishing.
4. demonstrate how to use fishing gear.
5. list skills needed to construct, repair, maintain fishing gear.
6. interpret laws pertaining to fish and fishing.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 10-30 hours

EVALUATION: Daily evaluation based on participation and attitude. Final evaluation based on student's reaching stated course objectives, pre and post tests.

TEACHER COMPETENCY: Working knowledge of small motors and small motor maintenance, fishing gear, and equipment, and North Carolina fishing laws.

INSTRUCTIONAL MATERIALS:

Books/Bulletins: - (1) Some North Carolina Fishes
(2) How to Catch Fish in Fresh Water
(3) Fish Conservation Fundamentals
(4) A Guide for Teaching Wildlife Conservation

Visuals: Filmstrip - Water Pollution

Film - Water Wisdom

GENERAL COMMENT: Each student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning activities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 15 TITLE: Commercial and Recreational Fishing

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. compare the scope of commerical and recreational fishing in state and local county in terms of enterprises, dollars, and occupations.

2. compare the relationship of marine life to our environment and the natural balances necessary for the growth of commercial and sport species.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Scope of Commercial and Recreational Fishing in N. C. and Local County A. Commercial Fishing Areas 1. coastal 2. lakes B. Recreational Fishing Areas 1. coastal 2. inland lakes and streams 3. farm ponds	1. Assign committees to survey existing commercial and recreational fishing areas of the state and lead class discussions to understand the scope of fishing in the state and local area.	Written or oral tests Teacher evaluation of student participation LAPS 15A, 15B, 15C, Pre-test	1, 2, 10, 11, 13 LAPS 15A, 15B, 15C,
II. Occupations in Commercial and Recreational Fishing A. Economic Importance in State and Local Area 1. commercial fishing 2. recreational fishing B. Occupational Opportunities 1. scope and availability 2. kinds and descriptions 3. requirements for entry and advancement	1. Take a field trip to a commercial fishing operation or similar business (in area where available). 2. Assign committees to collect information on the economic importance of the fishing industry in the state and job opportunities in each kind of industry. Discuss findings in class. 3. Invite local fishing tackle dealer to visit class to explain what he expects from an employee and opportunities in this field. 4. Take a field trip to a catfish farming	Teacher evaluation of student participation Written and oral tests LAPS 15A, 15B, 15C Post-test Student Self evaluation	1, 2, 8, 13, 14

TEACHING UNIT NO. 15 TITLE: Commercial and Recreational Fishing

TEACHING UNIT OBJECTIVES: 2. (cont'd) compare the relationship of marine life to our environment and the natural balances necessary for the growth of commercial and sport species.

Upon completion of this unit, the student will be able to:

3. identify gear and equipment needed in commercial and recreational fishing.

4. demonstrate how to use fishing gear.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	operation (if available).		
	5. Students visit different fish and meat markets to determine demand for catfish as food.		
Importance of Marine Life to Commercial and Sports Species	1. Invite guest speaker from N. C. Department of Fisheries to discuss importance of estuarine areas and food chains in development of commercial and sports species.	Student and teacher ratings of oral report and other participation. Written or oral tests.	2, 4, 10, 11, 13
	2. Student chooses a species and gives an oral report on the spawning, growth and migration patterns involved.		
Farm Ponds and Fish Farming A. Use of Farm Ponds for Fishing 1. for family recreation 2. as a source of income	1. Take a field trip to a local farm pond (open to public) and have owner discuss income potential and problems related to owning and operating the pond.	Teacher observation of student participation. Written or oral tests Rating management plan	1, 2, 3, 4, 5, 6, 7, 11, 13,14
	2. Have students make a survey of farm fish ponds in the school district and discuss the economic possibilities and recreational advantages offered.		
B. Managing Farm Pond for Fish 1. fish population 2. fertilization 3. weed control 4. banks and access management	3. Have classroom study and discussion of materials concerning fish pond managment.		
	4. Invite Soil Conservation Service worker to discuss farm fish pond		

TEACHING UNIT NO. 15 TITLE: Commercial and Recreational Fishing

TEACHING UNIT OBJECTIVES: 4. (cont'd) demonstrate how to use fishing gear.

Upon completion of this unit, the student will be able to:

5. list skills needed to construct, repair, and maintain fishing gear.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
C. Catfish Raising 1. fingerlings a. market potentia b. production 2. for meat a. market potentia b. production	5. Have students prepare a management plan for a farm pond.		
V. Selecting, Using and Maintaining Fishing Equipment A. For Commercial Fishing 1. otter trawl 2. haul seines 3. gill nets 4. purse seines 5. pound nets 6. butterfly nets	1. Instructor shows different types of nets using charts, films, slides, transparencies and discusses uses of each kind of net. 2. Instructor brings to class different types of net material used to make nets. Discusses and demonstrates techniques used to repair and construct nets.	LAP 15A, 15B, 15C, Pre-test Teacher observation of student participation Teacher and student ratings of performance of fishing techniques LAPS 15A, 15B, 15C Post-test	10, 11, 13 LAPS 15A, 15B, 15C
B. For Recreational Fishing (fresh and salt-water) 1. pole and line 2. fly casting equipment 3. spin casting equipment 4. bail casting equipment 5. nets and traps	3. Students make working models of haul seines, purse seines, pound nets, butterfly nets and channel nets. 4. Have class study and discussion on use of nets and traps. 5. Demonstrate different kinds of fishing equipment available. Take class to nearby pond or area and require each student to demonstrate familiarity with each kind of tackle and some degree of skill in its use.		

TEACHING UNIT NO. 15 TITLE: Commercial and Recreational Fishing

TEACHING UNIT OBJECTIVES: 5. (cont'd) list skills needed to construct, repair, and maintain fishing gear.

Upon completion of this unit, the student will be able to:

6. interpret laws pertaining to fish and fishing.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	6. Take the class fishing in a nearby available pond using all these kinds of tackle and baits.		
	7. Require each student to demonstrate ability to disassemble, make emergency repairs, and reassemble different kinds of fishing tackle from tieing line to cane pole to field stripping a spinning reel.		
VI. Laws Relating to Fish and Shellfish A. Inland Streams and Lakes B. Coastal Waters C. Private Waters	1. Classroom study and discussion of N. C. statutes on fish from N. C. Wildlife Commission and N. C. Dept. of Conservation and Development.	Written or oral tests	9, 12
	2. Have member of Wildlife Commission visit class to explain and discuss these laws.		
	3. Conduct a simulated public hearing on law changes.		
VII. Boating and Water Safety A. Selecting Small Boats for Fishing	1. Classroom study and discussion of kinds of boats used for fishing under different conditions.	Written or oral tests Student participation Teacher observation	12, 15, 16
B. Selecting Motors for Fishing Boats C. Boat Handling	2. Divide class into committees to visit boat showrooms or other places where boats may be observed and report in class on cost of boats, characteristics of different boats, etc. and outboard motors.	Student self evaluation	

TEACHING UNIT NO. 15 TITLE: Commercial and Recreational Fishing

TEACHING UNIT OBJECTIVES: 6. (cont'd) interpret laws pertaining to fish and fishing.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	3. Take class to a pond with boats available and have students paddle or row boat on a marked out course, observing proper water safety. 4. Have a boating safety demonstration by Boating Safety team of Wildlife Commission.		

SUGGESTED RESOURCES

A. BOOKS:

1. Rural Recreation for Profit. Smith, Clodus R., Partain, Lloyd E., and Champlin, J. R., The Interstate Printers and Publishers, Danville, Ill., 1968.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

2. Outdoors U.S.A. USDA, The Superintendent of Documents, 1967 yearbook, Washington D. C. 20402.

3. Some North Carolina Fishes. N. C. Dept. of Agriculture and Wildlife Resources Commission, Raleigh, N. C.

4. North Carolina Biology - SCS Technical Reference. Soil Conservation Service, Raleigh, N. C.

5. How to Catch Fish in Fresh Water. Fisherman's Information Bureau, 20 N. Wacher Dr., Chicago, Ill. 60606.

6. Warm Water Ponds for Fishing. U. S. D. A., Washington, D. C.

7. Fish Conservation Fundamentals. Sport Fishing Institute, Bond Building, Washington, D. C.

8. Raising Bait Fishes. Fish and Wildlife Service, U. S. Dept. of Interior, Superintendent of Documents, Washington, D. C.

9. North Carolina Statutes on Game, Fish and Boat Laws. North Carolina Wildlife Resources Commission, Raleigh, N. C.

10. Carteret County Seafood Research Project. Miller, Weeks and Nicholson, Morehead City, N. C.

11. Fishing North Carolina Waters. N. C. Wildlife Resources Commission, Raleigh, N.

12. North Carolina's Boating and Water Safety Law. N. C. Wildlife Resources Commissi Raleigh, N. C.

13. Fishing and Hunting - North Carolina. Travel and Promotion Division, Department of Conservation and Development, Raleigh, N. C.

14. A Guide for Teaching Wildlife Conservation. North Carolina Wildlife Resources Commission, Raleigh, N. C.

15. Boating Safety Course-Teacher's Manual. N. C. Wildlife Resources Commission, Raleigh, N. C.

D. AGENCIES:

16. Boat Safety Team-Safety Division. N. C. Wildlife Resources Commission, Raleigh, N. C.

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 16 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Camp Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the job opportunities available in the area of camp management and operation.
2. compare the scope of this type of recreation and its relationship to man's environment.
3. list skills needed for camp management and operation.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Daily evaluation based on attitudes and participation. Final evaluation based on student reaching stated unit objective, pre and post tests.

TEACHER COMPETENCY: Experience or equivalent background in camping and managerial experiences.

INSTRUCTIONAL MATERIALS:

Books: - (1) Official Boy Scout Manual
(2) Careers in National Park Service
(3) Guidelines to Planning, Developing and Managing Rural Recreation

Visual: Film - (1) America Goes Camping

GENERAL COMMENT: Each student should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 16 TITLE: Camp Maintenance and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify the job opportunities available in the area of camp management and operation.
2. compare the scope of this type of recreation and its relationship to man's environmemt.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities A. Scope and Availability B. Kinds and Description C. Requirements for Entry 1. education 2. experience 3. physical 4. others	1. Students investigate job opportunities in this area of study by visiting loca camping grounds and having someone speak on job opportunities in this area.	Evaluate class participatio Evaluate survey. Evaluate design.	1, 2, 4, 8, 13
II. Types of Camps and Activities A. Camping Areas 1. seasonal camps 2. year-round camps 3. state and national parks B. Types of Activities 1. outdoor activities a. group activities b. hiking and other sports 2. indoor activities a. games b. handicrafts	1. Make a survey of any local camps including campsites both privately and publicly owned. 2. Students design a camp to include campsites, facilities, trails, etc. 3. Visit any camping areas in your vicinity to observe the layout. 4. Invite a camp director or counselor to give a talk on his responsibilities. 5. Students plan a schedule of activities for a camp.	Observation teacher, classmates	1, 3, 6, 10, 9, 13, 8, 2

TEACHING UNIT NO. 16 TITLE: Camp Maintenance and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. list skills needed for camp management and operation.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Camp Organization A. Facilities 1. campsites 2. camps B. Maintenance of Camps C. Services to Campers	1. Invite state or national park superintendent to speak on the facilities provided for campers in these parks, maintenance, and services to campers. 2. Invite private owner of campsites to speak on his facilities for campers, maintenance and services to campers.	LAP 16A Pre-test LAP 16A Post-test	1, 5, 8, 9, 10, 6, 11, 7 TLS 20
IV. Staff Requirements A. Life Saving B. First Aid	1. Invite a lifeguard from a local pool to discuss his job with class. 2. Classroom demonstrations in first aid. 3. Invite a city official (Recreation Director) to speak on staff requirements for workers in recreation. 4. Students with an interest in this area of work enroll in either a life saving course or a first aid course.	LAP 16B Pre-test LAP 16B Post-test Written and/or oral test Student self evaluation	LAP 16B

SUGGESTED RESOURCES

A. BOOKS:

1. Management of Forest Resources for Multiple Use. Hine, Q. A., and Hoover, Norman K., Penn. State Univ., University Park, Penn.
2. Conserving American Resources. Parson, Ruben L., Prentice Hall, Inc. Englewood Cliffs, N. J.
3. Rural Recreation for Profit. Smith, C. R. Partain, L. E. and Champlin, J. R., Interstate Printers and Publishers, Inc., Danville, Ill., 1968.
4. Handbook of Agricultural Occupations. Hoover, Norman, K., Interstate Printers and Publishers, Inc., Danville, Ill., 1969.
5. Our Natural Resources. Kircher and McNall, The Interstate Printers and Publishers, Inc., Danville, Ill., 1970.
6. A Place to Live. Yearbook of Agriculture, 1963.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

7. Community Action Program for Outdoor Recreation. Department of Interior, U. S. Superintendent of Documents, Washington, D. C.
8. Guidelines to Planning, Developing and Managing Rural Recreation Enterprises. Bulletin 301, Sept., 1966, Cooperative Extension Service, Virginia Polytechnic Institute, Blacksburg, Virginia.
9. The Third Wave. Department of Interior, U. S. Superintendent of Documents, Washington, D. C.
10. It's Your World. Department of Interior, U. S. Superintendent of Documents, Washington, D. C.
11. Search for Solitude. USDA, Forest Service, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.
12. Careers in National Park Service. U. S. Dept. of Interior, National Park Service, Washington, D. C.
13. Official Boy Scout Manual. Boy Scouts of America.

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 17 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Boating and Marina Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. describe the scopy of the boating industry in North Carolina and local area, in terms of enterprises and occupational opportunities.
2. list abilities needed in occupations dealing with boating.
3. identify different types of boats and be familiar with construction materials.
4. list skills involved in maintaining and doing minor repairs to boats and motors.
5. cite laws that pertain to boat safety.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 6-60 hours

EVALUATION: Daily based on participation and attitudes. Final evaluation based on the degree each student can demonstrate attaining stated unit objectives, pre and post tests.

TEACHER COMPETENCY: Working knowledge of small motors, bookkeeping, sales management, and marina organization.

INSTRUCTIONAL MATERIALS:

Books: - (1) North Carolina Statutes on Game, Fish and Boat Laws
(2) Outdoor United States America
(3) Manual for Outboard Motors

Visuals: Films - (1) Boats, Motors and People
(2) Outboard Outings
(3) Suddenly Upon the Waters
(4) Water Wisdom

GENERAL COMMENT: Students should be encouraged to participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 17 TITLE: Boating and Marina Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. describe the scope of the boating industry in N. C. and local area in terms of enterp
   and occupational opportunities.
2. list abilities needed for occupations dealing with boating.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Scope of Boating Industry in N.C. and Local Area	1. Form class into committees to determine: a. money volume involved in boating in N.C. b. money volume involved in boating in home county or area c. types of businesses in boating in N.C. d. types of businesses in boating in home county or area e. number of businesses in boating in N.C.	Oral Reports Check list	14
	2. FFA organizes and puts on local boat show.		
II. Occupations in Boating	1. Form class into committees and list the jobs available in boating in N.C. and local area or county.	Student participation Teacher Observation	1, 13, 2 Marina Operation
	2. Class develops master list of occupations and skills necessary to each occupation.		7, 14, 15
	3. Field trip to local marina, boat dealer, or boat yard to observe workers and skills used.		

TEACHING UNIT NO. 17 TITLE: Boating and Marina Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. identify different types of boats and be familiar with construction materials.
4. list skills involved in maintaining and doing minor repairs to boats and motors.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Boats and Boat Construction	1. Instructor discusses different types of boats and boat construction to include wood, fiberglass, aluminum, and steel. Show films, slides and pictures of various types of construction and construction materials, including fastening devices.	Student self evaluation Student observation	
	2. Students visit boat yards, boat sales agencies or marinas and identify different types of boats and the construction methods used.		
	3. Students build boat of wood and/or fiberglass, under instructor supervision.		
IV. Repair and Maintenance of Boats	1. Instructor discusses repair of wooden boats and fiberglass boat hulls.	Student Demonstration Student self evaluation	6, 14
A. Repairs 1. wood 2. fiberglass 3. aluminum	2. Field trip to local boat yard or marina to observe methods of repairing boats of different types.		
	3. Students make repairs to damaged wood and fiberglass hulls. Students may bring in boats for repair.		
B. Finishing 1. wood a. deck b. hull c. bottom 2. fiberglass a. deck b. hull c. bottom	4. Instructor discusses different types of finishes applied to boats and demonstrates techniques used in applying them.		
	5. Students finish boats which have been built or repaired.		

TEACHING UNIT NO. 17 TITLE: Boating and Marina Management and Operation

TEACHING UNIT OBJECTIVES: 4. (cont'd) list skills involved in maintaining and doing minor repairs to boats and motors.

Upon completion of this unit, the student will be able to:

5. site laws that pertain to boat safety.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
3. aluminum and steel a. deck b. hull c. bottom	6. Instructor discusses maintenance of fiberglass and painted surfaces.		
	7. Instructor demonstrates proper method of renewing fiberglass finishes.		
C. Maintenance			
	8. Students practice renewing fiberglass surfaces.		
D. Boat Fittings and Hardware 1. deck hardware a. lights b. cleats c. ventilators d. trim	9. Field trip to local boatyard or marina to see different types of boat hardware and their resistance to weathering.		
2. through hull fittings a. water systems b. marine toilets c. suffing boxes d. bilge pumps	10. Instructor discusses materials used in boat hardware and advantages and disadvantages of each.		
	11. Students report on type of hardware they would select for different types of boats used under different kinds of conditions, and tell why they selected certain types of materials.		
V. Repair and Maintenance of Boat Motors	1. Discussion of marine gas and diesel engines, reduction gears, engine location and cooling systems.	Check list Student Demonstration Teacher observation	6,
A. Types of Inboard Marine Power Units 1. inboard outboard drive units	2. Field trip to local boat yard or marina to observe various types of marine power plants.	Student self evaluation	5, 10, 6, 14, 16
2. conventional marine gasoline engines a. carburetion	3. Use charts, slides, and films to discuss the I/O unit with students.		

TEACHING UNIT NO. 17 TITLE: Boating and Marina Management and Operation

TEACHING UNIT OBJECTIVES: 5. (cont'd) site laws that pertain to boat safety.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
b. cooling systems 1. open systems 2. closed systems a. heat exchanges c. reduction units d. propellors and propellor shafts	4. Students disassemble and reassemble I/O unit borrowed from local boat yard or dealer.		
	5. Students visit local boat yard or marina and observe repairs to I/O unit		
	6. Instructor demonstrates with charts, filmstrips or cut away model the four cycles of the gasoline engine.		
	7. Instructor brings in marine carburetor and compares the difference between it and conventional carburetor and discusses flame arresting principles.		
	8. Visit marina or boat yard and observe both types of cooling systems.		
	9. Instructor discusses the functions of both types of systems.		
	10. Students give advantages and disadvantages of both types of systems.		
	11. Discussion of reduction units and demonstration of how they work through use of films, slides, filmstrips, or an old reduction unit.		
	12. Visit to boat yard or marina to see reduction units in boats.		
	13. Students disassemble and reassemble reduction units.		

TEACHING UNIT NO. 17 TITLE: Boating and Marina Management and Operation

TEACHING UNIT OBJECTIVES: 5. (cont'd) site laws that pertain to boat safety.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	14. Display different types and sizes of propellors.		
	15. Discuss how to select correct propellor for specific uses.		
	16. Visit local boat yard and have students comment on propellors installed on local boats.		
	17. Demonstration of the removal of a propellor		
VI. Safe Boat Operation and Rules of Road	1. Invite a guest speaker from Coast Guard or local Power Squadron to speak on boat safety.	Student self evaluation Written tests	3, 4, 7, 9, 8, 1, 2, 6, 7
A. Safety 1. life preservers 2. fire extinguishers 3. ventilation	2. Review Coast Guard rules and regulations for power boats and discuss each one to determine why the rule or regulation is necessary.	Oral tests Teacher observation	17
B. Rules of Road 1. lights 2. signals	3. Discuss different types of fire extinguishers and demonstrate their use on different classes of fires.		
	4. Invite fire department member to give demonstration of fire extinguishers.		
	5. Have students prepare display of different types of life preservers showing advantages and disadvantages of each.		
	6. Discuss Coast Guard regulations		

TEACHING UNIT NO. 17 TITLE: Boating and Marina Management and Operation

TEACHING UNIT OBJECTIVES: 5. (cont'd) site laws that pertain to boat safety...

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
3. rules of road 4. buoys and buoyage a. types of buoys b. use of buoys 5. laws pertaining to boating a. rules and regulations b. insurance	7. Visit local boat yard or marina to study lights used on different classes of boats.		
	8. Set up light board and have students discuss lights needed for various situations.		
	9. Discuss coast guard rules pertaining to signals.		
	10. Students role play parts and give appropriate signals for vessels in various situations.		
	11. Discuss Coast Guard rules of the road.		
	12. Use situation board and have students demonstrate correct boat manuvers in passing and meeting situations.		
	13. Have students make and paint minature buoys and tell name and usual use of buoy.		
	14. Discuss use of buoys and day workers.		
	15. Review Coast Guard regulations and N. C. boating and water safety laws.		
	16. Have each student take one important boating rule or regulation and explain to class.		
	17. Invite insurance agent in as speaker to tell about liability laws and marine insurance.		

SUGGESTED RESOURCES

A. BOOKS:

1. Outdoors U.S.A. 1967 Yearbook of Agriculture, U. S. Government Printing Office, Washington, D. C.
2. Occupational Outlook Handbook. U. S. Dept. of Health, Education and Welfare, Washington, D. C.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

3. N. C. Statutes on Game, Fish, and Boat Laws. N. C. Wildlife Resources Commission Raleigh, N. C.
4. N. C. Boating and Water Safety Law. N. C. Wildlife Resources Commission, Raleigh, N. C.
5. Guidelines to Planning, Developing and Managing Rural Recreation Enterprises. Bulletin No. 301, Cooperation Extension Service, Virginia Polytechnic Institute, Blacksburg, Va., 1966.
6. Manual for Outboard Motors. Outboard Marina Corp., Milwaukee, Wis.
7. Boating Safety Course. N. C. Wildlife Resources Commission, Division of Motor Boats and Water Safety, Raleigh, N. C.
8. Boat Safety Team. N. C. Wildlife Resources Commission, Division of Motor Boats and Water Safety, Raleigh, N. C.

C. AUDIOVISUALS:

9. Boats, Motors, and People, N. C. Wildlife Resources Commission, Raleigh, N. C.
10. Outboard Outings, N. C. Wildlife Resources Commission, Raleigh, N. C.
11. Suddenly Upon the Waters, N. C. Wildlife Resources Commission, Raleigh, N. C.
12. Water Wisdom, N. C. Wildlife Resources Commission, Raleigh, N. C.
13. N. C. State Parks, Dept. of Conservation and Development, Raleigh, N. C.

D. AGENCIES:

14. Local Boat Dealers.
15. Community Boat builder.
16. Outboard Motor Mechanic.
17. State Patrol Officer.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 18 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Horses and Riding Stable Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. list the importance of saddle horses in outdoor recreation.
2. identify breeds of light horses, fundamentals of selection, type of horses.
3. list the fundamentals of feeding, grooming, housing and caring for horses.
4. describe safety practices in training and riding horses.
5. identify the wide range of employment opportunities with horses and outdoor recreation.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Student and teacher evaluation based on daily participation and ability of the student to do various activities or skills, pre and post tests.

TEACHER COMPETENCY: Experience or working knowledge of horsemanship.

INSTRUCTIONAL MATERIALS:

Books: - (1) Breeds of Light Horses (bulletin)
(2) Horses and Horsemanship
(3) The Stockman's Handbook
(4) Feeds and Feeding

Visuals: Films (1) Horse Sense
(2) The All American Horse
(3) Saddle Up

GENERAL COMMENT: Students should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 18 TITLE: Horses and Riding Stable Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. list the importance of saddle horses in outdoor recreation.
2. identify breeds of light horses, fundamentals of selection, type of horses.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Importance of a Riding Stable or Ranch	1. Classroom study.	Make report on visit to riding stable	1, 4
A. Who Owns Riding Horses in the Community	2. Students to visit a riding stable that is in operation.	Teacher evaluation on figuring income and expenses	TLS 27
B. How are Riding Horses Cared for in the Community	3. Invite a stable manager or a horse breeder to talk with students.		
C. Who Owns Riding Stables in the Community	4. Students figure expected income and expenses from riding stable operation.		
D. What Determines the Need for a Riding Stable Business 1. land requirements 2. facilities 3. labor 4. capital 5. interest in horses			
II. Planning and Developing Riding Areas	1. Students learn and identify characteristics of a good site for riding stable operation.	Student lay out a site for practice.	1
A. Selecting site 1. location 2. drainage 3. season 4. regulations a. zoning b. sanitation c. insurance	2. Students learn regulation pertaining to construction requirements, sanitation, and sewage disposal. 3. Students learn insurance and safety requirements.		

TEACHING UNIT NO. 18 TITLE: Horses and Riding Stable Management and Operation

TEACHING UNIT OBJECTIVES: (cont'd) identify breeds of light horses, fundamentals of selection, type of horses.

Upon completion of this unit, the student will be able to:

3. list the fundamentals of feeding, grooming, housing and caring for horses.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
e. others 5. clientele	4. Students visit an established ranch to observe trails and camping areas.		
B. Developing Trails	5. Students construct picnic shelters, tables or other buildings in appropriate areas.		
C. Camping Sites 1. roads and drives 2. providing water 3. providing meals 4. providing equipment			
D. Housing Facilities and Shelters 1. picnic shelters 2. stables 3. feed barns and bins 4. storage shelters 5. fences and corrals 6. others			
III. Selecting Horses A. Breeds and Characteristics 1. work horses 2. light horses 3. ponies	1. Students recognize some common breeds and types of horses and their suitability for riding purposes. 2. Students learn parts of horse and some common faults in breeds of horses.	Students demonstrate on a horse the points that could be unsound At a riding stable let a student identify the horses as to breed.	5, 2, 3, 6, 7
B. Basis for Selection 1. good condition and fleshing 2. easy keepers	3. Students learn general unsoundness in confirmation and gentleness of horses.	Student participation Observation teacher, classmate	

TEACHING UNIT NO. 18 TITLE: Horses and Riding Stable Management and Operation

TEACHING UNIT OBJECTIVES: 3. (cont'd) list the fundamentals of feeding, grooming, housing and caring for horses.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
3. gentle and a perfect disposition 4. overall conformation and gentleness a. ride, sack out, pick up feet, get on and off the wrong side b. blemishes c. back d. withers 5. buy from a good, reputable source C. Detecting Unsoundness in Horses 1. eyes a. blindness b. moon blindness 2. wind a. heaves b. roaring 3. hind leg a. stifled b. curb c. thoroughpin d. bog spavin e. bone spavin f. capped hock g. stringhalt 4. foreleg a. fistula b. capped elbow			

TEACHING UNIT NO. 18 TITLE: Horses and Riding Stable Management and Operation

TEACHING UNIT OBJECTIVES: 3. (cont'd) list the fundamentals of feeding, grooming, housing and caring for horses.

Upon completion of this unit, the student will be able to:

4. describe safety practices in training and riding horses.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
e. bowed tendon f. cocked ankles g. ringbone h. sidebone i. toe crocks j. navicular disease k. forender l. corns			
IV. Feeding Horses A. Types of Feed 1. grains 2. roughages 3. pastures 4. mineral supplements 5. commercial mixtures	1. Students learn these terms and their importance in feeding horses: nutrient, nutritive, maintenance ration, productive ration, fiber, concentrate, feeding standards, TDN, digestion, balanced ration, stomach, digestive system, digestive tract, and others. 2. Students list six most important nutrients in feeds for horses.	LAP 18A and 18B Pre-test	2, 3, 4, 6 LAP 18A, 18B
B. Balancing Rations 1. kinds 2. amounts	3. Students list important minerals and their function in a ration for horses.		
C. Providing Water	4. Students learn feeding and nutritional requirements of horses. 5. Students learn grinding, mixing, and balancing a ration. 6. Students visit a feed supply house to learn rations fed horses and jobs in this area.		

TEACHING UNIT NO. 18 TITLE: Horses and Riding Stable Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

5. identify the wide range of employment opportunities with horses and outdoor recreation.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
V. Caring for Horses A. Housing B. Exercise C. Grooming 1. techniques 2. equipment and supplies D. Health 1. sanitation 2. common diseases 3. common parasites 4. common injuries	1. Students learn skills in grooming: a. washing and cleaning b. trimming hoofs c. shoeing d. clipping and shearing	Student participation LAP 18A and 18B Post-test	5, 2, 3, 6, 4
VI. Training and Horsemanship A. Mounting and Dismounting B. Riding 1. equipment 2. courtesy 3. safety C. Different Gaits D. Caring for Equipment 1. cleaning 2. polishing and preserving 3. storing E. Showing at Halter	1. Point out to students that more and more jobs are becoming available in the field of recreation and animals. 2. Students list situations where horses are used in recreational activities.	LAP 18C Pre-test Teacher observe student handling horse Student clean and condition equipment LAP 18C Post-test	2, 3, 6 LAP 18C

TEACHING UNIT NO. 18 TITLE: Horses and Riding Stable Management and Operation

TEACHING UNIT OBJECTIVES: 5. (cont'd) identify the wide range of employment opportunities with horses and outdoor-recreation.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
VII. Occupational Opportunities A. Jobs Available B. Where are the Jobs C. Competencies to be Developed (skills required)		Make a list of jobs in the community and report to the class interviews with owners.	1, 7, 8

SUGGESTED RESOURCES

A. BOOKS:

1. Rural Recreation for Profit. Smith, Claude R., Partain, Lloyd E. and Champlin, J. R., The Interstate Printers and Publishers, Danville, Ill., 1968.

2. Horses and Horsemanship. Ensiminger, The Interstate Printers and Publishers, Danville, Ill.

3. The Stockman's Handbook. Ensiminger, The Interstate Printers and Publishers, Danville, Ill.

4. Feeds and Feeding. Morrison, The Morrison Publishing Company, Clinton, Iowa.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

5. USDA Bulletin. "Breeds of Light Horses," No. F2127, The Superintendent of Documents, Washington, D. C.

6. Horses and Horsemanship (4-H Horse Program), North Carolina Extension Service, Raleigh, N. C.

C. AUDIOVISUALS:

7. Horse Sense, N. C. State Univ. Film Library, Raleigh, N. C. 27607.

8. Local Stable Owner.

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 19 (Outdoor Recreation and Applied Ecology)

TEACHING TITLE: Parks and Recreational Area Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. describe the abilities necessary for job entry into occupations dealing with planning, operation, and management of park areas.
2. construct and renovate wildlife and recreational structures.
3. demonstrate operation of tractors and equipment necessary in park maintenance.
4. demonstrate game and fish management practices in parks.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Daily evaluation based on attitudes and participation. Final evaluation based on student reaching stated unit objectives, pre and post tests and job performance.

TEACHER COMPETENCY: Working knowledge of portable power tools, tractor maintenance, park maintenance.

INSTRUCTIONAL MATERIALS:

Books:
(1) Repairing and Constructing Farm Buildings
(2) Farm Tractor Maintenance
(3) Guidelines to Planning, Developing and Managing Rural Recreation Enterprises
(4) Handbook of Agricultural Occupations

Visual: Films
(1) Careers in Recreation
(2) Classrooms in the Park

GENERAL COMMENT: Each student should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 19 TITLE: Parks and Recreational Area Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. describe the abilities necessary for job entry into occupations dealing with planning, operation, and management of park areas.
2. construct and renovate wildlife and recreational structures.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities	1. Students list jobs and requirements for entry.	LAP 1B Pre-test	1, 2, 7, 6
A. Scope and Availability	2. Use resource persons to discuss employment opportunities.	Student Presentation of employment opportunities	LAP 1B
B. Kinds and Description		LAP 1B Post-test	
C. Requirements for Entry and Advancement 1. education 2. experience 3. physical 4. others			
II. Construction and Mechanics Related to Parks Management	1. Visit supply shed and supply store to learn about operation and different materials.	LAP 9A and 9B Pre-test Student reports on Building materials	1, 2, 3, 4, 7, 9 TLS 25 LAPS 9A, 9B
A. Building, Maintaining and Renovating Park Structures 1. construction materials 2. type and design of structures 3. care and maintenance of park structures	2. Students make a list of materials used in constructing a building from brick, blocks, stone, lumber, etc. and compare costs.	Student self evaluation	
	3. Students be able to explain the following terms: a. center match b. dropsiding c. siding (asbestos, artificial brick, asphalt) d. matched lumber e. stop (window or doors) f. roofing g. others		

TEACHING UNIT NO. 19 TITLE: Parks and Recreational Area Management and Operation

TEACHING UNIT OBJECTIVES: 2. (cont'd) construct and renovate wildlife and recreational structures.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
B. Maintenance and Operation of Tractors and Equipment 1. types of tractors and equipment 2. operation and care of tractors and equipment a. preventative maintenance b. operational maintenance c. safety precautions in operation of machinery d. operating parts of tractors, equipment and machinery e. correct handling of all operating parts of tractors, allied equipment and machinery f. procedure for ordering replacement parts g. operation of tractors, allied equipment and machinery h. operation of tractors and equipment in cold weather.	4. Students know grades of materials and be able to identify.	LAP 19A Pre-test Students read blueprints	LAP 19A TLS 7
	5. Students figure a bill of materials.	Students ability to construct recreation structures.	10
	6. Students discuss in class the types of structures generally used in parks.	Written test on the care and maintenance of part structures	1, 5, 7
	7. Carry students on tour and point out the different types and designs of buildings.	LAP 19A Post-test	LAP 19B 11
	8. Students learn to follow blueprints for dimensions and specification of structures.	LAP 19B Post-test Student use of tools	
	9. Construct a small building using plans and designs typical of park areas.	LAP 19B Pre-test Evaluation	
	0. Take students to a building that has not been well kept and have them to make a check list on what could have been done.	Student planning techniques Students mechanical skill	
	1. Students list the reasons for good care and maintenance of park structures.	Student self evaluation	
	2. Students learn the value of preservatives--paints, varnishes, stains, oils, etc.		
	3. Students become familiar with building and repair materials--wood, concrete, masonry, metal, roofing, nails and screws, paints, plastic, glues,		

TEACHING UNIT NO. 19 TITLE: Parks and Recreational Area Management and Operation

TEACHING UNIT OBJECTIVES: 2. (cont'd) construct and renovate wildlife and recreational structures.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
i. selection of proper fuels and lubricants 3. maintenance of tractors and equipment	14. Students be able to name and demonstrate use of basic tools used in the care and maintenance of park structures.	Students use of prescribed safety techniques Written and oral tests	
a. general maintenance	15. Students fill out requisition forms for supplies and equipment.	Observation of students ability to rewire a tractor.	
b. identification and nomenclature of systems of tractors	16. Students select tractors and equipment for specific jobs.		
1. cooling 2. fuel 3. ignition	17. Students identify parts of tractor and equipment.		
4. electrical 5. hydraulic 6. power transmission 7. chassis	18. Field trip to nearby tractor and equipment dealer to observe and study sizes, types and kinds of tractor equipment.	LAP 19B Post-test Test on tool identifjcation	12
c. servicing each of the systems	19. Students operate tractors and equipment on farm or at school.		
d. machine specifications e. trouble shooting and how to perform	20. Students perform preventative maintenance on tractors in school shop, on farm or in businesses.		
f. maintaining and adjusting air, fuel, and exhaust systems	21. Teacher and students prepare a preventive maintenance sheet on points to check on tractors and equipment.		
g. adjusting belts and pulleys h. maintaining cooling systems	22. Teacher and students prepare a list of safety precautions relative to preventive maintenance and operation of machinery.		
i. adapting tractors and equipment for different jobs	23. Students identify operating parts		

TEACHING UNIT NO. 19 TITLE: Parks and Recreational Area Management and Operation

TEACHING UNIT OBJECTIVES: 2. (cont'd) construct and renovate wildlife and recreational structures.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
j. understanding and using operators manual	24. Students trace the various systems on tractors and/or machinery.		
C. Tool Selection and Maintenance	25. Students perform some type of trouble shooting.		
1. common hand and power tools needed in parks operation	26. Students perform some necessary maintenance on some type of tractor or equipment.		
2. factors to consider in selecting hand and power tools 3. importance of tool care and maintenance	27. Students secure an operator's and service manual of several kinds of farm machinery and become familiar with them.		
a. cleaning and oiling b. sharpening and fitting	28. Students list tools purchased at home and tell why they think they were properly or improperly selected.		
c. storage 4. safety practices in selection and maintenance of hand and power tools	29. Visit a shop to observe selection and maintenance of tools. Discuss observations made after returning to classroom.		
	30. Teacher and students make a list of tool maintenance practices.		
	31. Students bring to shop and learn to fit and shape common hand and power tools.		

TEACHING UNIT NO. 19 TITLE: Parks and Recreational Area Management and Operation

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

5. demonstrate operation of tractors and equipment necessary in park maintenance.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Natural Resources Management Related to Parks	1. Students name and give characteristics of some animals, fowls and fish of each type.	LAPS 11A, 11B, 12 Pre-test Reports on wildlife in N.C.	1, 2, 7 TLS 26 LAPS 11A, 11B, 12
A. Game and Fish Management 1. types of game species	2. Students and teacher formulate plans that would help increase production.	LAPS 11A, 11B, 12 Post-test	
a. farm game b. forest game c. migratory game	3. Visit park areas and observe wildlife in natural habitat.	LAP 8A, 8B Pre-test Student self evaluation	TLS 24
d. fish species 2. management practices	4. Use resource persons: game warden, forest ranger, park ranger, etc.	LAPS 8A, 8B Post-test	LAPS 8A, 8B 13
a. reproduction and breeding grounds b. feeding habits c. diseases and parasites	5. Students list forest practices that have caused a decrease in game.	Students plans for Nature Trail	
d. controlling predators	6. Visit and have students inspect damage caused by burning.		
e. local, state and federal rugulations	7. Students plan and establish forest picnic area, and natural trails, if possible.	LAP 6 Pre-test Student evaluation of TLS 18	LAP 6 TLS 6, 18
B. Forests Management 1. trees and plants a. for recreation and aesthetic values	8. Students list some examples of poor water shed management.	LAP 6 Post-test	
1. types and species	9. Students and teacher secure species and stock a farm pond.		
2. when and how to plant	10. Demonstrate weed control methods on established water area.		
b. for game feed 1. types and species 2. when and how to plant	11. Use local resource persons on enforcement regulations.		

TEACHING UNIT NO. 19 TITLE: Parks and Recreational Area Management and Operation

TEACHING UNIT OBJECTIVES:

3. (cont'd) demonstrate operation of tractors and equipment necessary in park maintenance.

Upon completion of this unit, the student will be able to:

4. demonstrate game and fish management practices in parks.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
C. Water Management 1. proper control of water shed into streams, rivers and lakes 2. managing fishing areas a. stocking 1. best time 2. size to stock 3. feeding b. weed control 1. impprtance 2. methods c. enforcing local, state and federa regulations			
IV. Providing Facilities and Services A. Camping Sites B. Tables C. Fireplaces D. Bath Houses E. Electricity F. Water G. Sewage Facilities	1. Students make a study of these facilities and list requirements for each. 2. Visit and observe a park already in operation.	LAP 9A Pre-test 14A 14B 14C LAP 9A, Post-test 14A 14B 14C	1, 2, 14 TLS 7, 19, 1, 12, 20 LAP 9A, 14A, 14B, 14C TLS 15

TEACHING UNIT NO. 19 TITLE: Parks and Recreational Area Management and Operation

TEACHING UNIT OBJECTIVES: 4. (cont'd) demonstrate game and fish management practices in parks.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
V. Public Relations and Communications Relating to Parks Management	1. Students write an article for local newspaper on some activity conducted by class.	Current events presentation oral and/or written. Student self evaluation	8
A. Communications Media 1. newspapers 2. magazines 3. news letters 4. radio and television 5. advertising 6. bulletin boards 7. public appearances 8. others	2. Students present radio and/or TV program. 3. Students learn to operate visual equipment, tape recorders, two-way radios, etc. 4. Students give speeches in class. 5. Use resource persons.		

SUGGESTED RESOURCES

A. BOOKS:

1. Outdoors U.S.A. U. S. Dept. of Agriculture, Superintendent of Documents, Washington, D.C., 1967 yearbook.

2. Rural Recreation for Profit. Smith, Clodus R., et. al., The Interstate Printers and Publishers, Inc., Danville, Ill., 1968.

3. Repairing and Constructing Farm Buildings. Worley, J. C., McGraw Hill Book Co., New York, N.Y.

4. A Primer in Blueprint Reading. Agricultural Extension Bureau, Republic Steel Corp., Birmingham, Ala.

5. Farm Tractor Maintenance. Brown and Morrison, The Interstate Publishers and Printers, Inc., Danville, Ill., 1968.

6. Handbook of Agricultural Occupations. Hoover, Norman K., The Interstate Publishers and Printers, Danville, Ill., 1969.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

7. Guidelines to Planning, Developing and Manageing Rural Recreation Enterprises. Bulletin 301, Cooperative Extension Service, Virginia Polytechnic Institute, Blacksburg, Virginia.

8. Newspapers and magazines.

9. Local Parks Manager.

10. Parks Designer (Architect).

11. Local tractor repairman.

12. Tools salesman demonstration.

13. Local forest Ranger.

14. Parks Commission.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 20 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Sewage and Waste Disposal in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the occupations connected with sewage and waste disposal.
2. describe methods for waste and sewage disposal.
3. list factors involved in planning and developing waste disposal systems.
4. demonstrate skills needed in the disposal of sewage and waste.
5. define regulations concerning waste and sewage disposal.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Teacher and student evaluation based heavily on daily participation and practical experiences including SOE, pre and post tests, lab exercises and job performance.

TEACHER COMPETENCY: Have a knowledge of up-to-date laws, regulations, and ordinances of federal, state, and area having to do with pollution; working knowledge of waste disposal systems.

INSTRUCTIONAL MATERIALS:

Books: - (1) Mechanics in Agriculture
(2) Our Natural Resources
(3) Rural Recreation for Profit

Visuals: Film The River Must Live
Filmstrip Water Pollution

GENERAL COMMENT: Each student should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit and might take place at home, on the farm, in local schools, recreationa areas, and businesses.

PART III

ENVIRONMENTAL SUBJECT UNITS

TEACHING UNIT NO. 20 TITLE: Sewage and Waste Disposal in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify the occupations connected with sewage and waste disposal.
2. describe methods for waste and sewage disposal.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities	1. Invite local sanitation department official to speak on job opportunities in this area.	Written or oral tests	4
A. Scope and Availability		Student participation	TLS 19
B. Kinds and Description	2. Invite a health department official to speak on jobs in the area of health.		
C. Requirements for Entry and Advancement 1. education 2. experience 3. physical 4. others	3. Invite septic tank sales, installation, or service man to speak to class on skills necessary in the job.		
	4. Students write or give oral reports on job opportunities in sewage and waste disposal.		
II. Sources of Waste Products	1. Visit sewage treatment plant and observe the operation.	LAP 20A Pre-test	
A. Human By-Products		Student participation	1, 2, 3, 5
B. Garbage	2. Visit land-fill area or county garbage disposal units. Observe type of work available.	Written or oral tests	LAP 20A
C. Junk		Give students LAP 20A Post-test	
D. Industrial By-Products	3. Take a survey to find out the number of local junk yards in operation and workers employed.	Observation teacher, classmate	
E. Agricultural By-Products 1. livestock manure 2. poultry manure	4. Visit local industry to find out their waste disposal procedure.		
	5. Visit a lagoon type waste disposal unit on a nearby farm.		
	6. Have students calculate the amount of waste products from their families for		

TEACHING UNIT NO. 20

TITLE: Sewage and Waste Disposal in Our Environment

TEACHING UNIT OBJECTIVES:

Upon completion of this unit, the student will be able to:

3. list factors involved in planning and developing waste disposal systems.
4. demonstrate skills needed in the disposal of sewage and waste.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Planning and Developing Sewage and Waste Disposal Systems	1. Invite a soil conservationist to speak on the best way to select a site for a septic tank.	LAP 20B Pre-test Written and oral tests	1. 2, 3, 5, 6, 7 10 LAP 20B
A. Location of Sewage and Waste Systems 1. type of soil 2. placement depending on surroundings 3. health standards	2. Find out health standards and local laws involved in putting in a septic tank. 3. Study the types of waste disposal systems and determine which ones the individual citizen should use.	Student participation LAP 20B Post-test	
B. Types of Waste Disposal 1. burning 2. land fill 3. filter systems 4. lagoons 5. fertilizer 6. chemical treatment 7. recycling 8. others	4. Visit a recycling operation in an industry and observe operation (i.e., paper, metal, etc.) 5. Invite a county official to speak on the cost of public disposal systems and their maintenance and the jobs involved.		
C. Costs of Disposal Systems 1. source of funds 2. comparison of different types 3. maintenance and operating costs			
IV. Relationship to Man and Environment A. Health	1. Invite a health official to speak on diseases in county caused by improper sewage and waste disposal.		

TEACHING UNIT NO. 20 TITLE: Sewage and Waste Disposal in Our Environment

TEACHING UNIT OBJECTIVES: 4. (cont'd) demonstrate skills needed in the disposal of sewage and waste.

Upon completion of this unit, the student will be able to:

5. define regulations concerning waste and sewage disposal.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
1. disease 2. rodents	2. Investigate any rodent control program in the area.	Written or oral tests	1, 2, 3, 5 LAP 3B
B. Pollution 1. air 2. water 3. soil	3. Invite wildlife biologist to speak on the effects of improper sewage and waste disposal on wildlife.	Teacher observation of student participation Student self evaluation	
C. Aesthetic Values	4. Have students determine the effect of improper sewage and waste disposal on recreational facilities.		
D. Recreation			
E. Ecology	5. Take or have students make pictures of unsightly places caused by waste and show to class. Give emphasis to improvements needed.		
F. Wildlife			
V. Laws and Regulations	1. Invite a county official to speak on local requirements and laws on sewage and waste disposal.	Student participation Written or oral tests	1, 2, 5, 8, 9, 7, 10,6
A. Federal			
B. State	2. Have students conduct a class hearing on this subject.		
C. Local			

SUGGESTED RESOURCES

A. BOOKS:

1. Rural Recreation for Profit. Smith, Clodus R., Partian, Lloyd E. and Champlain, J. R., The Interstate Printers and Publishers, Inc., Danville, Ill., 1968.

2. Mechanics in Agriculture. Phipps, Lloyd J., et. al., The Interstate Printers and Publishers, Inc., Danville, Ill., 1967.

3. Our Natural Resources. McNall, P. E. and Kircher, Harry B., The Interstate Printers and Publishers, Inc., Danville, Ill., 1970.

4. Handbook of Agricultural Occupations. Hoover, Norman K., The Interstate Printers and Publishers, Inc., Danville, Ill., 1969.

5. Agricultural Policy Review. Agricultural Policy Institute, N. C. State University, Vol. 9, No. 1, 1969, Raleigh, N. C.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

6. Bulletin # 519, State Board of Health, Raleigh, N. C.

7. Animal Waste Disposal Systems, N. C. Extension Service, N. C. State College, Raleigh, N. C.

D. AGENCIES:

8. Local County Sewage Disposal Ordinance, Local Health Dept. or County Board of Health.

9. Local Solid Waste Disposal Ordinance, Local Health Dept. or County Board of Health.

10. Farm Waste Disposal - Local Soil Conservation Service.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 21 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Air in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify occupational opportunities in the area of air control.
2. list citizens' roles in establishing and maintaining clean air standards.
3. compare and contrast the relationship of clean air to other aspects of one's environment.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 2-10 hours

EVALUATION: Teacher and student evaluation based on daily activities and practical experiences including supervised occupational experiences, pre and post tests.

TEACHER COMPETENCY: Have a knowledge of up-to-date law, regulations, and ordinances of federal, state, and area having to do with pollution.

INSTRUCTIONAL MATERIALS:

Books: - (1) Outdoors United States America
(2) Teachers Guide to Environmental Education
(3) Occupations in Environmental Control

Visuals: Films - (1) Air Polluction and You
(2) A Matter of Attitudes

Filmstrip - Air and the Agricultural Environment

GENERAL COMMENT: Student should participate in work experiences, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 21 TITLE: Air In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify occupational opportunities in the area of air control.
2. list citizens role in establishing and maintaining clean air standards.
3. compare and contrast the relationship of clean air to other aspects of ones environment.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities A. Scope and Availability B. Kinds and Description C. Requirements for Entry and Advancement 1. education 2. experience 3. physical 4. others	1. Have public official speak on clean air control in the county and his job responsibilities.	Written and oral reports Interview reports	9, 10
II. Importance of Clean Air A. Components of Air B. Plant and Animal Relationships to Air	1. Visit local plants to see what is being done on controlling air pollutants. 2. Observe effects of air pollutants on local vegetation. 3. Students write various industrial plants to determine what industry is doing to control air pollution.	Students use of air pollution devices.	3, 8, 6, 5, 12
III. Air Pollution A. Types and Sources B. Effects 1. health 2. economic	1. Make a survey of community and list all major sources of air pollution. 2. Invite someone in the medical profession to speak to class on effects of air pollution to health, and employment opportunities in the field.	Student self evaluation LAP 21 - Pre-test	3, 8, 6, 11 LAP 21 TLS 4

TEACHING UNIT NO. 21 TITLE: Air In Our Environment

TEACHING UNIT OBJECTIVES: 3. (cont'd) compare and contest the relationship of clean air to other aspects of ones environment.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
IV. Relationships to Other Natural Resources and to Man	1. Arrange for students to explore selected operations that workers in air control perform.	Observation teacher classmate Student participation	7, 13
	2. Have public official speak on programs in local county being done to keep air clean.	LAP 21 Post-test	
V. Laws and Regulations			
A. State			
B. Federal			

SUGGESTED RESOURCES

A. BOOKS:

1. Our Natural Resources. McNall, P.E. and Kirchner, Harry B., The Interstate Printers and Publishers, Inc., Danville, Illinois.
2. Outdoors U.S.A. The Yearbook of Agriculture, 1967, The United States Government Printing Office, The Superintendent of Documents, Washington, D.C. 20402.
3. Handbook of Agricultural Occupations. Hoover, Norman K., The Interstate Printers and Publishers, Inc., Danville, Illinois.
4. Conserving American Resources. Parson, Ruben L., Second Edition, Prentice Hall, Inc., Englewood Cliffs, N.J.
5. Soil Science in the South East. Welsh, C. D., The University of North Carolina Press, Chapel Hill, N.C.
6. Conserving American Resources, Parson, Ruben L., Second Edition, Prentice Hall, Inc., Englewood Cliffs, N.J.
7. Department of the Interior Conservation Yearbooks:
   Quest for Quality
   The Population Challenge
   The Third Wave
   Man, An Endangered Species
   It's Your World
   River of Life

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

8. Teacher's Guide for Environmental Education. The North Carolina Department of Public Instruction, Raleigh, N.C.
9. Occupations in Environmental Control. Lewis, Wiley B., The Center for Vocational and Technical Education, The Ohio State University, 1900 Kenny Road, Columbus, Ohio 43210.
10. The Farm Index. The United States Department of Agriculture, Washington, D.C.
11. Air
    Ag Ed. Environmental Ed. Series
    Washington State University.

C. AUDIOVISUALS:

12. Effects of Air Pollution on Plant Life, USDA Slide set.
    (Source) Photo Lab Inc.
    Filmstrips, 3825 Georgia Ave. N.W., Washington, D.C. 20011.
13. Air In Our Environment. (Slide film from VEP Set Agriculture and Our Environment.)

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 22 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Chemical and Radiation in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the scope and kinds of occupations in this area.
2. list the sources of chemical pollution and the reasons why we continue to use things that cause pollution.
3. compare the effects of chemicals and radiation on an aspect of our environment.
4. demonstrate the safe use of chemicals that could pollute by radiation.
5. describe the important laws and regulations related to these chemicals.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Daily based on participation and attitudes. Final evaluation based on the degree of proficiency shown by each student in stated unit objectives, pre and post tests, lab exercises and job performance.

TEACHER COMPETENCY: Have a knowledge of up-to-date law, regulations, ordinances of federal, state and area having to do with pollution.

INSTRUCTIONAL MATERIALS:

Books: - (1) Occupations
(2) North Carolina's Work in Environmental Protection
(3) That We May Live

Visuals: Film - Perspective on Pesticides

Filmstrip - (1) Agriculture and Environment
(2) About Fallout
(3) Air for Adam

GENERAL COMMENT: Students should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 22

TITLE: Chemical and Radiation in Our Environment

TEACHING UNIT OBJECTIVES:

Upon completion of this unit, the student will be able to:

1. identify the scope and kinds of occupations in this area.
2. list the sources of chemical pollution and the reasons why we continue to use things that cause pollution.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities A. Scope and Availability B. Kinds and Description	1. Invite a chemical company representative to talk to class about job opportunities in this area, emphasizing jobs in pollution control.	Student reports on visits to chemical dealers.	13
C. Requirements for Entry and Advancement 1. education 2. experience 3. physical 4. others	2. Students to prepare a list of occupations in this area.		
II. Sources of Chemical Pollution	1. Invite resource person to discuss the beneficial and harmful effects of agricultural chemicals commonly used in the area.	Student self evaluation	1, 7, 8, 11, 10, 13, 9 TLS 29 20
A. Industry 1. toxic metals 2. organic chemical compounds 3. pesticides 4. inorganic chemicals 5. inert materials	2. Have each student dress properly for using dangerous chemicals. 3. Students survey merchants to determine agricultural chemicals used most frequently in the community.		
B. Agriculture 1. insecticides 2. herbicides 3. fungicides 4. nematocides 5. rodenticides 6. medicines	4. Teacher to collect a display of chemical containers and have each student read the directions in class.		

TEACHING UNIT NO. 22 TITLE: Chemicals and Radiation in Our Environment

TEACHING UNIT OBJECTIVES:

2. (cont'd) list the sources of chemical pollution and the reasons why we continue to use things that cause pollution.

Upon completion of this unit, the student will be able to:

3. compare the effects of chemicals and radiation on an aspect of our environment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
7. fertilizers	5. Summarize dangerous aspect of handling chemicals on chalk board. Discuss proper disposal plan for chemical containers.		
C. Government 1. treated sewage 2. chemical warfare	6. Set up rat control campaigns in local area as a class activity.		
	7. Show students some food, corn, fruit, etc. damaged by insects or diseases and discuss the effects of chemicals in their control.		
III. Radiation	1. Students use geiger counter to measure radioactive particles.		1, 7, 16, 17
A. Sources			
B. Effects of Radiation	2. Show and discuss films and magazine articles on effects of radiation.		
C. Storage and Disposal	3. Class to discuss some of the future applications of radiation.		
D. Future Uses of Radiation	4. Discuss harmful effects of radiation.		

TEACHING UNIT NO. 22 TITLE: Chemicals and Radiation in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

4. demonstrate the safe use of chemicals that could pollate by radiation.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
IV. Relationship of Chemicals and Radiation to Our Environment	1. Investigate newspaper, magazines, and journals for articles on chemical and radiation pollution in the environment.	LAP 22 Pretest	15, 9, 4, 5, 11, 2, 18, 19, 3
A. Economic	2. Invite wildlife biologist to speak on the effects of chemicals on wildlife species in the area.		
B. Wildlife 1. DDT effects 2. mercury effects 3. lindane effects 4. chemicals in water	3. Determine which species of wildlife have decreased in the area and for what reasons.		LAP 22 21, 22
C. Recreation and Aesthetic 1. herbicides 2. insecticides	4. Invite county agent to speak on the usage of chemicals on crops in the county.		8, 14
D. Safe Use of Chemicals	5. Invite representative from chemical company to speak on the safe use of chemicals and what is being done to eliminate some of the problems.	LAP 22 Post-test	
E. Health 1. help control diseases 2. overuse and residue	6. Study and observe the effect of chemical and radiation pollution on air, water, and soil.	Student self evaluation	
F. Pollution 1. air 2. water 3. soil	7. Invite soil conservationist to speak on the effects of chemicals on soil and water.		
	8. Demonstrate and have students to demonstrate safe use of certain chemicals in local greenhouse.		

TEACHING UNIT NO. 22 TITLE: Chemicals and Radiation in Our Environment

TEACHING UNIT OBJECTIVES: 4. (cont'd) demonstrate the safe use of chemicals that could pollate by radiation.

Upon completion of this unit, the student will be able to:

5. describe the important laws and regulations related to these chemicals.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	9. Show and discuss films and other visuals on safe use of pesticides.		
V. Laws and Regulations A. State B. Federal C. Local	1. Have a person with authority speak on federal, state and local laws concerning chemical and radiation pollution.		
	2. Have students attend local public hearing concerning chemical and radiation pollution.		23
	3. Teacher ideas.		

SUGGESTED RESOURCES

A. BOOKS:

1. Our Natural Resources. McNall, P.E. and Kircher, Harry B., The Interstate Printers and Publishers, Inc., Danville, Ill., 1970.
2. Conservation Yearbooks, The U.S. Dept. of the Interior, The Superintendent of Documents, U.S. Goverment Printing Office, Washington, D. C. 20402: River of Life.
3. Man, An Endangered Species.
4. Our Natural Resources. McNall, P. E. and Kircher, Harry B., The Interstate Printers and Publishers, Inc., Danville, Ill., 1970.
5. Conserving American Resources. Parson, Ruben L., Prentice Hall, Inc., Englewood Cliffs, N.J.
6. That We May Live. Whitten, J. L., D. Van Nostrand Co., Inc., Princeton, N.J.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

7. North Carolina's Work in Environmental Protection. Scott, Dept. of Conservation and Development, State of North Carolina, Raleigh, N.C. 1970.
8. Protect Your Family From Hazards of Household Chemicals. N.C. Extension Service, Raleigh, N.C.
9. N.C. Pesticide - Fertilizer Manual. N.C. Extension Service, Raleigh, N.C.
10. Wildlife in N.C. Magazine. June, 1971, p. 7.
11. Teachers Guide for Environmental Education. State Dept. of Public Instruction, Raleigh, N.C.
12. Wildlife in North Carolina Magazine. February, 1971. p. 22.
13. Occupations in Environmental Control. Center for Voc. and Tech. Ed. Ohio State University, 1900 Kenny Road, Columbus, Ohio 43210.

C. AUDIOVISUALS:

14. Agriculture and The Environment. Film Strip, Vernard Organization, 113 N. E. Madison, Peoria, Ill. 61602.
15. Safe Use of Pesticides. Film Strip, Vocational Education Productions, California State Polytechnic College, San Luis Obispo, Cal. 93401.
16. About Fallout. N. C. State Univ. Film Service, Raleigh, N.C.
17. Air for Adam, N.C. State Univ. Film Service, Raleigh, N.C.
18. The Third Wave.
19. It's Your World.

SUGGESTED RESOURCES

D. AGENCIES:

20. Chemical Dealer.
21. County Agent.
22. Soil Conservationist.
23. Representative N. C. Pesticides Dept.

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PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 23 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Noise in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify occupational opportunities in the field of noise control.
2. identify the danger involved in loud levels of noise for long periods of time.
3. describe the laws relating to noise in our environment.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 4-20 hours

EVALUATION: Evaluation based heavily on daily participation and practical experiences including supervised occupational experiences, pre and post tests.

TEACHER COMPETENCY: Have a knowledge of up-to-date law, regulations, and ordinances of federal, state, and area having to do with pollution.

INSTRUCTIONAL MATERIALS:

Books: - (1) Noise Pollution
(2) North Carolina Wildlife Magazine, February, 1971

GENERAL COMMENT: Student should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 23 TITLE: Noise in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify occupational opportunities in the field of noise control.
2. identify the danger involved in loud levels of noise for long periods of time.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities A. Scope and Availability	1. Invite an environmental or industrial engineer to speak on his job responsibilities and other job opportunities.	LAP 23 Pre-test	2
B. Kinds and Description	2. Students take field trip to industries where noise is a problem.	Students report on current events (newspaper articles)	LAP 23
C. Requirements for Entry and Advancement 1. education 2. experience 3. physical 4. others	3. Use a audiometer to check students' hearing.		
II. Sources A. Industries	1. Have students visit three plants to compare noise in operation.	Oral reports	1, 3 TLS 5
B. Individual C. Agriculture	2. Study the types of noise from different types of machinery (i.e., tractors, small engine, records, cars, etc.).		

TEACHING UNIT NO. 23 TITLE: Noise in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this, the student will be able to:

3. describe the laws relating to noise in our environment.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Relationship to Man and His Environment	1. Have a doctor or health department person speak on affects of long term noise on the human ear.	Observation teacher classmate	
	2. Bring newspaper articles to class for discussion.		
	3. Conduct experiment and/or have reports on effects of noise on plant growth.		
IV. Laws and Regulations A. Local B. State C. Federal	1. Have county official visit and talk on laws or regulations for machinery.	LAP 23 Post-test Written reports	
	2. Have a representative from manufacturing company speak on the design of motors.	Student self evaluation	4

SUGGESTED RESOURCES

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

1. North Carolina Wildlife Magazine. February, 1971, N. C. Wildlife Resources Commission, Raleigh, N. C.
2. Noise Pollution. National Parks Association, 1701 18th St., N. W., Washington, D. C. 20036.
3. Newspaper Articles.
4. County Official.

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WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 24 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Thermal Pollution in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the occupational possibilities and list their requirements in this area.
2. cite sources of thermal pollution.
3. list the harmful effects of thermal pollution on our environment.
4. describe the problems involved in controlling thermal pollution.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-10 hours

EVALUATION: Teacher and student evaluation based heavily on daily participation and practical experiences including supervised occupational experiences, pre and post tests.

TEACHER COMPETENCY: Have a knowledge of up-to-date law, regulations and ordinances of federal, state and area having to do with pollution.

INSTRUCTIONAL MATERIALS:

Books: - (1) It's Your World
(2) Occupations in Environmental Control
(3) Air and Water Pollution

GENERAL COMMENT: Student should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 24 TITLE: Thermal Pollution in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify the occupational possibilities and list their requirements in this area.
2. cite sources of thermal pollution.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities A. Scope and Availability	1. Invite wildlife biologist or other appropriate person to talk to class on the effects of thermal pollution on fish life.	LAP 24A Pre-test Student reports	3, 1
B. Kinds and Description	2. Students survey possibilities for employment in this area.		
C. Requirements for Entry and Advancement 1. educational 2. experience 3. physical 4. others			
II. Sources of Thermal Pollution A. Industrial Plants	1. Students gather newspaper or magazine articles on this subject and bring to class for discussion.	LAP 24A Post-test Student current events report	LAP 24A 2
B. Home Furnaces	2. Students check temperature of water and air near a steam generating plant.		
C. Boat Motors D. Airplanes E. Nuclear Explosions	3. Discuss the amount of heat given off by certain reactions such as nuclear explosions, car engines, jets, etc.		

TEACHING UNIT NO. 24

TITLE: Thermal Pollution in Our Environment

TEACHING UNIT OBJECTIVES:

Upon completion of this unit, the student will be able to:

3. list the harmful effects of thermal pollution on our environment.
4. describe the problems involved in controlling thermal pollution.
5. write laws and regulations concerning thermal pollution.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Relationship to Man and His Environment	1. Students conduct experiments to show effects of heat on aguatic plants and animals.	Student self evaluation	
A. Harmful to Water Animals	2. Students give short, imprompt speech on topics related to thermal pollution effects on man.		
B. Harmful to Water Plants			
C. Overall Effects 1. recreation 2. water use 3. weather	3. Visit places where there is evidence of thermal pollution. Students give their recommendations for solving the problems.		
IV. Economics of Thermal Pollution Control	1. Invite someone from industry to explain what his industry is doing to control thermal pollution and the costs of such a program.	LAP 24B Pre-test	
A. Technology vs Environment		Observation teacher classmate Student participation	
B. Costs 1. to industry 2. to government 3. to consumers 4. to ecology	2. Students to debate the value of advanced technology.	LAP 24B Post-test	LAP 24B
V. Laws and Regulations	1. Discuss laws relating to thermal pollution.	Student self evaluation	
A. Federal			
B. State	2. Invite attorney or public official to speak on laws and ordinances concerning thermal pollution.		
C. Local			

SUGGESTED RESOURCES

A. BOOKS:

1. It's Your World. Conservation Yearbook Number Five, Superintendent of Documents, Washington, D. C.
2. Air and Water Pollution. Kilzinger, Lyons and Carnahon, Inc., Chicago, Ill.
3. Occupations in Environmental Control. Eric Clearinghouse on Vocational and Technical Education, The Center for Vocational and Technical Education, The Ohio State University, 1900 Kenny Road, Columbus, Ohio. 43210.

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 25 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Population in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. identify the possibilities for employment in this field of population control.
2. describe the trends of population growth on the local, state, national and world levels.
3. list the effects of over population on our environment.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student.

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 5-20 hours

EVALUATION: Student and teacher evaluation with heavy emphasis on daily activities and practical experiences including supervised occupation experiences, pre and post tests.

TEACHER COMPETENCY: Working knowledge of social and economic groups affecting over population.

INSTRUCTIONAL MATERIALS:

Books: - (1) Man and Endangered Species
(2) The Population Challenge

Visuals: Film - (1) Standing Room Only
(2) Population Statistics
(3) Population Trends

GENERAL COMMENT: Students should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 25 TITLE: Population In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. identify the possibilities for employment in this field of population control.
2. describe the trends of population growth on the local, state, national and world levels.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Occupational Opportunities A. Scope and Availability	1. Students to interview someone working in this area to determine what this worker does. Report to class.	LAP 25A Pre-test Interview reports	LAP 25A
B. Kinds and Description		LAP 25A Post-test	4, 6, 7
C. Requirements for Entry and Advancement 1. educational 2. experience 3. physical 4. others			
II. Population Statistics and Trends A. Local	1. Teacher and/or students compile census population figures for different areas in school district.	Observation teacher classmates	
B. State C. National D. World	2. Ask students how many children are in their families and compare to how many were in their parents' families. Reach conclusions as to the reasons for increase or decrease.	Student self evaluation	
	3. Students give short talks on "What I think the population of my area will be in ten years and why".		
	4. Show and discuss filmstrips: Population Statistics and Population Trends.		

TEACHING UNIT NO. 25 TITLE: Population In Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

3. list the effects of over population on our environment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
III. Effects of Overpopulation on Environment	1. Visit and observe the living conditions in a city and rural area.	LAP 25B Pre-test	1, 2, 3, 5, 6, 7 LAP 25B
A. Increased Demand for Resources 1. land 2. air 3. food 4. minerals 5. forests 6. wildlife 7. others	2. Invite law enforcement officer to speak to students on problems linked to overpopulation.	LAP 25B Post-test	
	3. Crowd students in a small place for one class period. Discuss their reactions.	Student participation Written or oral reports	6, 7
	4. Ask urban and rural students to explain why they prefer living in a particular area.		
B. Social Disorders 1. violence 2. breakdown of maternal care 3. unneeded crowding 4. others	5. Students determine space for each person in N.Y. compared to each person in his area by dividing area by population. Discuss the implications for jobs.		
C. Space D. Pollution	6. Have students compare job listings in large city newspaper versus a small town newspaper.		
	7. Students divide into groups to calculate the amount of different kinds of waste causing pollution in a specific area.		
IV. Population Control A. Natural 1. starvation	1. Discuss the ways nature keeps humans and other animals from overpopulation.		

TEACHING UNIT NO. 25 TITLE: Population In Our Environment

TEACHING UNIT OBJECTIVES: 3. (cont'd) list the effects of over population on our environment

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
2. diseases 3. war 4. environmental conditions 5. predation	2. Students report on the number of people who die from accidents or natural causes in the county in a given period of time.		
	3. Show and discuss films: Standing Room Only.	Student population reports	5, 6, 7
V. Problems of Population Control A. Legal	1. Invite a welfare representative to discuss "planned parenthood" with implications for the young worker today.		
B. Religious C. Social	2. Invite attorney to talk to class on the legal problems of distributing population over a larger geographic area.	Written and/or oral test	
D. Educational	3. Invite social services worker to talk to class on social problems resulting from early marriages and parenthood.		
	4. Hold simulated public hearing on some specific proposal concerning increasing efforts to help local population problems. Students to play roles of key occupations involved in situation.		

SUGGESTED RESOURCES

A. BOOKS:

1. Our Natural Resources. McNall, P. E. and Kircher, H. B., The Interstate Printers and Publishers, Inc., Danville, Ill., 1970.

2. The Population Challenge. The U. S. Dept. of Interior Conservation Yearbook Number 2, Superintendent of Documents, Washington, D. C. 20402.

3. Man, An Endangered Species. The U. S. Dept. of Interior Conservation Yearbook Number 4, Superintendent of Documents, Washington, D. C. 20402.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

4. 1970 U. S. Census Report. U. S. Government Printing Office, Superintendent of Documents, Washington, D. C. 20402.

C. AUDIOVISUALS:

5. "Standing Room Only," Modern Talking Pictures, Charlotte, N. C.

6. Population Statistics, Cathedral Films, W. Ed. Productions.

7. Population Trends, Cathedral Films, Q. Ed. Productions.

D. AGENCIES:

8. Social Service Worker.

9. State Department of Representative.

WORK COPY

PROGRAM AREA: Agriculture-Business and Natural Resources

CAREER CLUSTER: Agricultural Resources OE CODE: 01.06

TEACHING UNIT NO. 26 (Outdoor Recreation and Applied Ecology)

TEACHING UNIT TITLE: Mineral Resources in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this Unit, the student will be able to:

1. describe the importance of mineral and natural resources in our national economy.
2. identify the importance and effect of surface mining.
3. explain how exploiting natural resources effect eco-systems.
4. identify the occupational possibilities in the field of mineral resources.

SUGGESTED TEACHING UNIT SEQUENCE: To be determined by teacher and student

RECOMMENDED PREREQUISITES: Biology

TEACHING UNIT LENGTH: 3-15 hours

EVALUATION: Student and teacher evaluation through participation, pre and post tests.

TEACHER COMPETENCY: Basic knowledge and understanding of minerals found in the state, mining procedures, and eco-systems.

INSTRUCTIONAL MATERIALS:

Books: - (1) Out Natural Resources
(2) Conserving American Resources

GENERAL COMMENT: Student should participate in work experience, exploratory activities, FFA and additional practical learning opportunities. These activities are considered an integral part of this unit of instruction and might take place at home, on the farm, in local schools, recreational areas, and businesses.

TEACHING UNIT NO. 26 TITLE: Mineral Resources in Our Environment

TEACHING UNIT OBJECTIVES: Upon completion of this unit, the student will be able to:

1. describe importance of mineral and natural resources in our national economy.
2. identify the importance and effect of surface mining.
3. explain how exploiting natural resources effect eco-systems.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
I. Minerals vs Renewable Natural Resources	1. Students list non-renewable minerals and determine why they are being depleted.	LAP 26A Pre-test LAP 26A Post-test	2, 3, 4, 1 LAP 26A
	2. Students list natural resources and determine how they are reclaimed.	Participation	TLS 23
	3. Students write a conclusion concerning the importance of conserving mineral resources and discuss findings with the class.		
II. Surface Mining	1. Students list the kinds of surface mining operations common to their area. Collect samples of minerals produced by each and arrange a labeled exhibit of collected minerals.	LAP 26B Pre-test LAP 26B Post-test Student self evaluation	2, 1, 7 LAP 26B
	2. Students visit surface mines.		
	3. Students visit a mineral museum.		
	4. Invite a speaker from mineral industries to discuss the overall operation of his industry, his role in the business, and requirements for employment.		
III. Natural Resources and Ecosystems	1. Students prepare a map of a local area, locate surface mine areas to show land disturbed by mineral exploitation and decide how these areas affect the ecology.	Observation teacher class mates Written reports	1, 2, 3, 4, 5, 6, 7

TEACHING UNIT NO. 26 TITLE: Meneral Resources in Our Environment

TEACHING UNIT OBJECTIVES:

3. (cont'd) explain how exploiting natural resources effect eco-systems.

Upon completion of this unit, the student will be able to:

4. identify the occupational possibilities in the field of mineral resources.

CONTENT	SUGGESTED TEACHING-LEARNING EXPERIENCES	SUGGESTED EVALUATION TECHNIQUES	SUGGESTED RESOURCE MATERIALS
	2. Class discussion on these findings with decisions reached as to what is being done to reclaim these areas or what can be done.		
	3. Correlate all materials into a bulletin board to stress the seriousness of any problems that exist.		
IV. Occupational Possibilities	1. Students list all occupations concerned with surface mining operations in a local situation. List the qualification requirements, employer expectations, characteristics of jobs, opportunities for advancement, salaries, rewards and satisfactions.	Student oral reports concerning surface mining occupations.	8, 9

SUGGESTED RESOURCES

A. BOOKS:

1. Our Natural Resources. McNall, P. E. and Kircher, H. B., The Interstate Printers and Publishers, Inc., Danville, Ill., 1970.
2. Conserving American Resources. Parson, Ruben L., Prentice Hall, Inc., Englewood Cliffs, N. J., 1964.
3. Handbook of Agricultural Occupations. Hoover, Norman K., The Interstate Printers and Publishers, Inc., Danville, Ill.
4. River of Life. U. S. Department of the Interior, Conservation Yearbook Series vol. 6, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.
5. It's Your World. U. S. Department of the Interior, Conservation Yearbook Series vol. 5, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.
6. The Third Wave. U. S. Department of the Interior, Conservation Yearbook Series vol. 3, Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402.
7. Man, An Endangered Species. U. S. Department of the Interior, Conservation Yearbook Series vol. 4, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

B. PAMPLETS, CIRCULARS, BULLETINS, ETC.:

8. Teacher Guide For Environmental Education. The N. C. Department of Public Instruction, Raleigh, N. C.
9. American Vocational Journal. May, 1971, p. 20-24.
10. Reader Service Department, P. O. Box 2553, Clinton, Iowa 52732.

APPENDIX A

Sources of Additional Reference Materials

Federal Government Agencies

1. U. S. Department of Agriculture

Extension Service
Washington, D. C.

Forest Service
50 Seventh Street, N. E.
Atlanta, Georgia 30323

Soil Conservation Service
Washington, D. C.

National Agricultural Library
The Information Office
Fourteenth St. and Independence Ave., S. W.
Washington, D. C. 20250

2. U. S. Department of Commerce

Environmental Science Services Administration
Office of Public Information
6010 Executive Building
Rockville, Md. 20852

3. U. S. Department of Health, Education, and Welfare

Food and Drug Administration
Consumer Protection and Environmental Health Service
200 C St., N. W.
Washington, D. C. 20204

National Air Pollution Control Administration
Consumer Protection and Environmental Health Service
200 C. St., N. W.
Washington, D. C. 20204

Institute for Air Pollution Training
P. O. Box 12055
Research Triangle Park, N. C. 27709

U. S. Office of Education
400 Maryland Ave., S. W.
Washington, D. C. 20202

4. U. S. Department of the Interior

Office of Conservation Education
Bureau of Sport Fisheries and Wildlife
Room 3242, Interior Building
Washington, D. C. 20240

Information Officer
Bureau of Commercial Fisheries
Room 3042, Interior Building
Washington, D. C. 20240

Information Officer
National Park Service
Room 2325 Interior Building
Washington, D. C. 20240

Information Officer
Bureau of Land Management
Room 5643, Interior Building
Washington, D. C. 20240

Information Officer
Bureau of Outdoor Recreation
Room 4125, Interior Building
Washington, D. C. 20240

Information Officer
Office of Saline Water
Room 5024, Interior Building
Washington, D. C. 20240

Information Center
Federal Water Pollution Control Administration
Washington, D. C. 20242

Information Officer
Bureau of Reclamation
Room 7642, Interior Building
Washington, D. C. 20240

North Carolina Governmental Agencies

1. North Carolina State Board of Health
P. O. Box 2091
Raleigh, North Carolina 27602

2. N. C. Department of Agriculture
1 West Edenton Street
Raleigh, North Carolina 27611

3. Department of Conservation and Development

    A. Division of Commercial and Sport Fisheries
    P. O. Box 27687
    Raleigh, N. C. 27602

    B. Division of State Parks
    P. O. Box 27687
    Raleigh, North Carolina 27611

    C. North Carolina Forest Service
    P. O. Box 2719
    Raleigh, North Carolina 27611

    D. Division of Mineral Resources
    P. O. Box 2719
    Raleigh, North Carolina 27611

4. Department of Local Affairs
P. O. Box 1991
Raleigh, North Carolina 27602

5. Department of Water and Air Resources
P. O. Box 27048
Raleigh, North Carolina 27611

6. N. C. Wildlife Resources Commission
P. O. Box 2919
Raleigh, North Carolina 27602

Organizations

1. Air Pollution Control Division
4400 Fifth Avenue
Pittsburgh, Penn. 15213

2. American Conservation Association
30 Rockefeller Plaza
New York, N. Y. 10020

3. American Forest Products Industries
1835 K Street, N. W.
Washington, D. C. 20006

4. American Forestry Association
919 17th Street, N. W.
Washington, D. C. 20006

5. Boy Scouts of America
New Brunswick
New Jersey 08903

6. Citizens for Clean Air
40 West 57th Street
New York, N. Y. 10019

7. Forest Farmer Association
1375 Peachtree St., N. E.
Atlanta, Ga. 30309

8. National Parks Association
1300 New Hampshire Ave., N. W.
Washington, D. C. 20036

9. National Wildlife Federation
1412 Sixteenth St., N. W.
Washington, D. C. 20036

10. North Carolina Wildlife Federation
P. O. Box 948
Rocky Mount, N. C.

11. National Rifle Association
1600 Rhode Island Ave., N.W.
Washington, 6, D. C.

Sources of 16 MM Film

1. Modern Talking Pictures Service
503 North College St.
Charlotte, North Carolina 28202

2. Farm Film Foundation
Suite 819-Southern Bldg.
1425 H. Street, N. W.
Washington, D. C. 20005

3. Visual Aids Film Library
N. C. State University
Raleigh, North Carolina 27607

4. E. I. DuPont De Nemours and Co.
Advertising Department
Motion Pictures Section
1007 Market St.
Wilmington, Del. 19898

5. Shell Oil Company
450 N. Meridian St.
Indianapolis, Ind. 46204

6. Ideal Pictures, Inc.
1010 Church St.
Evanston, Ill. 60201

7. Sterling Movies, USA
375 Park Avenue
New York, N. Y. 10022

8. United World Films, Inc.
221 Park Ave., South
New York, N. Y. 10003

9. General Motors Corporation
Public Relations Staff - Film Library
General Motors Bldg.
Detroit, Mich. 48202

10. North Carolina Wildlife Commission
Division of Education
P. O. Box 2919
Raleigh, North Carolina 27602

11. Soil Conservation Service
Motion Picture Library
P. O. Box 11222
Fort Worth, Texas 76110

12. Associated Films, Inc.
Executive Offices
600 Madison Ave.
New York, N. Y. 10022

13. Texaco, Inc.
P. O. Box 1722
Atlanta, Ga. 30301

APPENDIX B

A Regional Listing of Some of the More Important Natural and Man-Made Environmental Locations in North Carolina

Cape Hatteras National Seashore

Covers 28,000 acres of land. This outer banks reserve will always provide an opportunity to study estuarine and marine life as well as plant succession, zonation due to tides, and any number of sand dune environment. Bodie Island Visitor's Center near Bodie Island Lighthouse, the Museum of the Sea, near Cape Hatteras Lighthouse and Visitor's Center at Silver Lake Marina in Ocracoke, Pea Island acres between Pamlico Sound and the Atlantic Ocean.

North Carolina State Parks

Cliffs of the Neuse

434 acres in Wayne County. Fishing, swimming, picnicking, hiking, nature study and museum. Route #2, Seven Springs, North Carolina.

Fort Macon

390 acres in Cartaret County. Historic fort, museum, bathing, hiking, and nature study. Atlantic Beach, North Carolina.

Hammocks Beach

890 acres in Onslow County. Reached by ferry (no vehicles) June 1 to Labor Day. Bathing, fishing, picnicking, hiking, and nature study.

Jones Lake

1,893 acres in Bladen County. Picnicking, swimming, boating, camping, hiking and nature study. Route #2, Elizabethtown, North Carolina.

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*From Teacher's Guide for Environmental Education, North Carolina Department of Public Instruction, Raleigh, North Carolina

Pettigrew

Comprises 17,368 acres (including Lake Phillips) in Washington and Tyrell Counties. Boating, fishing, hiking, historic structures and nature study are available. Route #1, Creswell, North Carolina.

Singletary Lake

1,221 acres in Bladen County. Boating, fishing, hiking and an organized camp are available. Elizabethtown, North Carolina.

Weymouth Woods

Sandhills Nature Preserve. 403 acres (all undeveloped). Southern Pines, North Carolina.

Cartaret County Marine Science Project

ESEA III. This project offers a program of curriculum development, including teaching units and field trip guides for grades 4-10. The Center, at Beaufort, serves as an interpretive center, demonstration area, field trip nucleus, laboratory, reference library and information center.

International Nickle Company

Wrightsville Beach, North Carolina

Marine Museum

Title III program with Field Areas. Morehead City, North Carolina

Phosphate Mines

Aurora, North Carolina.

Robeson County Educational Resource Center

A small, newly organized Resource Center housing a planetarium, library, audio-visual center, and instructional materials display area. Lumberton, North Carolina 28358.

Saline Water Research Station

The Office of Saline Water Conversion of the Department of the Interior operates this facility at Wrightsville Beach. It is primarily used in pilot project testing of larger facilities. An excellent place to observe what may be one source of the nation's drinking water in the future.

National Forests in North Carolina

Croatan National Forest

Between the Neuse and White Oaks Rivers south of New Bern, this Forest contains 152,351 acres extending south along the New Port River. Recreation points at Cedar Point at Swannsboro and Neuse River Recreation area at Croatan are available.

State Forests

Bladen Lake State Forest

36,000 acres near Elizabethtown in Bladen County are owned and operated by the State of North Carolina. Jones and Singletary Lakes are within the Forest. An excellent example of science forest management, this Forest shows examples of cutting, reforestation and utilization.

Lakes and Rivers

Roanoke Rapids Lake Lake Gaston	on the Roanoke River in Warren, Halifax and Northampton Counties
White Lake	Bladen County
Lake Waccamaw	Columbus County
Lake Phelps	Washington County
Mattamuskeet Lake	Hyde County

Intracoastal Waterway

There are 265 miles of U. S. Intracoastal Waterway between Virginia and South Carolina with towns along the Waterway rich in historical interest. The Waterway is of historical importance to the development of North Carolina.

PIEDMONT

North Carolina State Parks

Hanging Rock

4,030 acres in Stokes County. Picnicking, bathing, hiking and nature study available. Danbury, North Carolina.

Morrow Mountain

4,135 acres in Stanley County. Picnicking, swimming, camping, hiking, nature study and a museum. Route #2, Albemarle, North Carolina.

Pilot Mountain

2,145 Acres in Surry County. Picnicking, hiking, and nature study. Route #1, Pinnacle, North Carolina 27043.

William B. Umstead

5,323 acres in Wake County. Picnicking, camping, organized camps, boating and nature study. Route #8, Raleigh, North Carolina.

Lakes And Rivers

Lake Norman	Catawba, Iredell Counties
High Rock Lake	Davidson, Rowan Counties
Lake Tillery	Stanley, Montgomery Counties
Badin Lake	
Lake Rhodhiss	Burke County
Lake Hickory	Alexander, Catawba Counties

Cabarrus County Space and Earth Science Center

An ESEA Title III Project which supplements the science instruction in Cabarrus County. The center has two earth science supplementary labs and a planetarium. The Center organizes field work at nearby ponds and streams in the area. Write:

Director, Cabarrus Co. Space and Earth Science Center
Box 338
Concord, North Carolina 28025

Morehead Planetarium

Public programs, graded school programs, exhibits, planet room. Chapel Hill, North Carolina

N. C. State Museum of Natural History

P. O. Box 2281, Raleigh, North Carolina 27602

Rockinham County Diversified Outdoor Education Center

This is a Title III, ESEA Project which supplements the instructional program of the Rockingham County area schools by providing a summer camp and other outdoor educational activities. The project takes a field approach to environmental education. Wentworth, North Carolina 27375.

Salisbury City Supplementary Education Center

This ESEA Title III Supplementary Education Center provides the area schools with education specialists in space science and natural science. This program includes nature study through the field tour approach. Write:

Director, Salisbury City Supplementary Education Center
314 N. Ellis Street
Salisbury, North Carolina 28144

MOUNTAINS

National Parks in North Carolina

Great Smokey Mountains National Park

512,673 acres total with approximately one-half in North Carolina. It includes Clingman's Dome, 6,642 feet; second highest point in North Carolina. The Park contains 1,300 flowering plant varieties, 52 species of fur-bearing animals and 130 species of trees. Guided nature tours are available from spring to October. Provides camping, nature trails, hiking, fishing and other recreational activities. The Pioneer Museum and Farmstead at Oconaluftee Ranger Station on U.S. Highway 441 is open year round.

Blue Ridge Parkway

A mountain-top drive with average elevation over 3,000 feet. 245 miles of parkway between Virginia and the Great Smokies. Interesting sites along the parkway include:

- Cumberland Knob: 2,855 feet; includes 1,000 acres with picnicking foot trails; galax, laurel and other mountain flora.
- Doughton Park: 3,508 feet; 6,000 acres with picnicking, camping, and 20 miles of trails with laurel, azalea, and rhododendron profusely growing among other flora.
- E. B. Jeffress Park: 3,550 feet; with comfort station and a nature trail following a mountain stream to a waterfall of several hundred feet.
- Moses H. Cone Memorial Park: 3,579 feet; 3,600 acre former private estate; has 25 miles of riding and carriage trails; and fishing lakes.
- Julian Price Memorial Park: 3,400 feet; 4,200 acres with picnicking, camping, trout fishing, and hiking.
- Linville Falls: 3,200 feet; 500 acres with picnicking; selfguiding nature trail with spectacular views of the waterfall and Linville Gourge, a wild area of Pisgah National Forest.
- Crabtree Meadows: 3,735 feet; 250 acres of hiking trails, picnicking and camping.

- Craggy Gardens: 5,892 feet; 700 acres with self-guiding trails; visitor's center; and abounds in the crimson (catawba) rhododendron.
- Mount Pisgah: 5,000 feet; 690 acres with picnicking and camping.
- Balsam Mountain: 5,340 feet; with limited recreational facilities.
- The Museum of North Carolina Minerals at Gillespie Gap near Spruce Pine exhibits most of the 300 kinds of minerals and gen stones found in North Carolina.

North Carolina State Parks

Mount Jefferson

540 acres in Ashe County with picnicking, hiking, and nature study. Jefferson, North Carolina.

Mount Mitchell

1,275 acres in Yancey County with picnicking, museum, hiking, camping, nature study and observation tower. Route #5, Burnsville, North Carolina.

National Forests in North Carolina

Pisgah National Forest

479,232 acres encompassing 600 miles of trails, including 80 miles of the Appalachian Trail. Many other scenic locations offering camping, fishing, swimming, nature study and other recreational activities.

Nantahala National Forest

This 449,869 acre forest west of Asheville is located in waterfall country. There are 320 miles of hiking trails with 75 miles of the Appalachian Trail. Accomodations within the Forest have the usual recreational facilities.

Lakes and Rivers

The TVA operates Chatuge Lake near Hayesville and Fontana Lake, highest in the TVA system, at Fontana Village, and Hiwassee Lake, largest overflow dam of TVA near Murphy, for power and flood control. These lakes abound with fish and serve as recreational centers for visitors.

W. Kerr Scott Dam and Reservoir in Wilkes County, Lake James in Burke County, and Lake Lure in Rutherford County, offers recreational facilities and nature study areas as well.

Corundum Hill

Gen Mines, minerals.

Corundum Hill Enterprises, Inc.
Franklin, North Carolina

Coweeta Hydrologic Laboratory

Coweeta Hydrologic Laboratory
P. O. Box 601
Franklin, North Carolina

Highlands Biological Station

Highlands, North Carolina

Mica Mines

Spruce Pine, North Carolina

THE FOLLOWING SPACE MAY BE USED FOR LISTING ADDITIONAL

es, Inc.
a

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a

na

lina

LISTING ADDITIONAL FIELD TRIP LOCATIONS:

APPENDIX C

Films and Visual Materials

Visual Aids Film Library
3 Ricks Hall
N. C. State University
Raleigh, N. C. 27607

"Pattern of the Wild" (26 Min. C)
Proper wildlife management in our national forests.

"Perspective on Pesticides" (14 Min. C)
Suggestions for safe use of pesticides.

"Piedmont Crescent" (28 Min.)
Planned-quality growth of the crescent area.

"So little Time" (28 Min. C)
Study of ducks, geese and other wild birds and mammals.

"We're on Our Way" (25 Min. C)
National Youth Conference on National beauty and conservation.

Ortho Film Library
Chevron Chemical Company
P. O. Box 29127, Briarcliff Station
Atlanta, Georgia 30329

"World of Insects" (22 Min. C)
How insects compete with man for his environment. (Return Postage)

"Safe In Your Own Backyard" (14 Min. C)
Basic safety precautions for all garden chemical use. (Return Postage)

Vocational Education Productions
California State Polytechnic College
San Luis Obispo, California 93401

"Agricultural Chemical Safety"
Teaching-learning kit includes: (a) teacher's handbook, (b) ten student manuals, (c) over-head transparency masters. (Price $10.00)

"Water Pollution" (No. 193-1)
Filmstrip, taped narration and illustrated script. (Price $7.50)

"Ecology and Agriculture"
Kit includes 5 filmstrips:

1. Ecology and the Agricultural Environment.
2. Soil and the Agricultural Environment.
3. Water and the Agricultural Environment.
4. Air and the Agricultural Environment.
5. People and the Agricultural Environment.

Choice of reel tapes, tape cassettes or records, Illustrated script for each filmstrip, over-head transparency masters, teacher's handbook, and ecology materials. (Price $40.00)

Motion Picture Bureau
Dept. of Public Relations
Union Pacific Railroad
7416 Dodge St.
Omaha, Nebraska 68102

"Painted Canyons"
Parks and scenes from Zion, Bryce and Grand Canyons. (Return Postage)

"Northwest Empire"
Life in the great Northwest. Beauty spots and wildlife in its natural habitat. (Return Postage)

"Wild Shore" (26 Min. C)
Marine and bird life along the Pacific coast. (Return postage)

"Blades of Green" (15 Min. C)
Importance and use of grass. (Return Postage)

Shell Film Library
450 N. Meridian St.
Indianapolis, Indiana 46204

"Food or Famine" (28 1/2 Min. C)
Presents the impending threat of mass starvation and what is being done to prevent it. (Return Postage)

"The Living Soil" (20 Min. C)
How science is fighting to reduce the threat of soil pests. (Return Postage)

"The Rival World" (27 Min. C)
Portrayal of the struggle between man and the insect. (Return Postage)

"The River Must Live" (21 Min. C)
Causes, effects, and solutions of water pollution. (Return Postage)

Encyclopedia Britannica Films
38 West 32nd Street
New York, New York 10001

"The Beach - A River of Sand" (20 Min. C)
A study of waves, sand, and how man stabilizes the beach.

"Grand Canyon" (26 Min. C)
One of nature's wonders.

"Nature's Plan" (15 Min. C)
The natural water plan; from sea to air to earth.

"Face of the Earth" (12 Min. C)
Wearing down forces on the earth.

"The Great Lakes - How They Were Formed" (11 Min. C)

"Water and What It Does" (11 Min. C)

"Wind and What It Does" (11 Min. C)

Filmstrip: "Giving Our Wildlife A Chance"
A filmstrip advocating wildlife conservation.

North Carolina Wildlife Resources Commission
Division of Education
Albemarle Building
Raleigh, North Carolina

Reservations for films can be obtained by writing:

Mrs. Doris Williams
Division of Education
Wildlife Resources Commission
P. O. Box 2919
Raleigh, North Carolina 27602

ANIMALS

"Mammals of the Countryside" (11 Min. B & W)
The natural history and importance of eight species of mammals in North Carolina.

"Wildlife Babies" (25 Min. C)
Depicts the young of a number of wildlife species in their natural habitat.

BIRDS

"Birds of Prey" (27 Min. C)
Eight years in the making, this film tells the story of nature's most efficient predators, the hawks, eagles and owls.

"Know Your Ducks" (15 Min. C)
This film is a short course in duck identification.

"The Bald Eagle, Our National Bird" (33 Min. C)
The life history of our majestic national bird comes to the screen in vivid color.

"The Story of the Mourning Dove" (38 Min. C)
The film follows the life of the dove through the year. Hunting sequences demonstrate why the species is popular everywhere.

"The Whooping Crane" (14 Min. C)
This film focuses on the life history of the vanishing Whooping Crane and the conservation measures being taken to save it from extinction.

"The Wild Turkey" (25 Min. C)
Probably the best film ever done on the majestic wild turkey, with magnificent photography of the birds habits and life cycle.

"Wild Fowl in Slow Motion" (10 Min. C)
The beauty and grace of flight comes to the screen as many species of waterfowl perform.

"Wood Duck Ways" (20 Min. C)
This film shows many interesting events in the life of the wood duck that are seldom seen by sportsmen and emphasizes the value of nesting boxes.

WATER

"Clean Waters" (24 Min. C)
This conservation film graphically contrasts the many benefits derived from clean water with the many losses resulting from pollution.

"Waters of Coweeta" (20 Min. C)
In the Coweeta Valley in Western North Carolina, the U.S. Forest Service studies the effects of various land uses on the streams of a small watershed.

"We share this Land" (16 Min. C)
Demonstrates how correct soil and water conservation management on the farm can greatly increase better habitat for our wildlife.

ECOLOGY

"A Way of Life" (27 Min. C)
This outstanding film explains the important role predators play in maintaining the balance of nature.

"Conservation and Balance in Nature" (18 Min. C)
This film explains that balance through observation of various animals and the special niche they maintain in natural surroundings.

"Estuarine Heritage" (25 Min. C)
This film tells of the great value of the estaurine-salt marsh complex to both man and wildlife, and of the dire consequences of its destruction.

FISH

"Life in a Trout Stream" (10 Min. C)
This film is a study of the problems of survival faced by a trout in a rocky stream. In an underwater sequence, egg laying, fertilization, and hatching are shown.

"The Sunfish" (11 Min. B & W)
Presents the natural history of a sunfish.

HUNTING

"Bay at the Moon" (30 Min. C)
The excitement of hunting with hound dogs is for everyone to enjoy in this film.

"Gunning the Flyways" (30 Min. C)
Want to do duck or goose hunting? This action-packed film will take you to choise spots across the continent -- including Lake Mattamuskeet in North Carolina.

"Quail Hunt" (10 Min. C)
Exciting hunting scenes and good dog work capture the delights of autumn hunting. Sound conservation overtones tell why's and wherefore's of quail food and cover.

"The White-Tail Buck" (29 Min. C)
A young boy learns some valuable lessons in his first hunt for one of America's most popular big game species...the white-tail deer.

"Unusual Hunting in North Carolina" (14 Min. C)
Tarheel sportsmen seek gray foxes on the Outer Banks, waterfowl at Lake Mattamuskeet, and wild boar on the Santeelah Wildlife Management Area.

HUNTER SAFETY

"Lost Hunter" (22 Min. C)
A simply told story of a man who became lost. He tells why he got lost, the mistakes he made, the things he did right, and how he is found.

"Shooting Safety" (both 12 and 25 Min. versions C)
A group of parents and sportsmen initiate a gun safety program for the youth of their community.

"Sure As Shooting" (22 Min. C)
A father-and-son weekend hunting trip provides some valuable tips in gun handling and hunter safety in this film.

"Trigger Happy Harry" (20 Min. C)
Film effectively points out the "common sense" rules of safe gun handling through the blunders of Trigger Happy Harry.

NATURE STUDY

"Exploring the Farmland" (13 Min. C)
Three youngsters visit a farm for an exciting day of discovery. They find everything from swallows to baby skunks.

"Field Trip to a Fish Hatchery" (10 Min. B & W)
The operation of a large government fish hatchery and natural history of trout.

"Islands of Green" (24 Min. C)

As America's rapidly dwindling wilderness area become more remote, the value of nature education increases. This film illustrates the vital role nature centers play.

"The Window" (17 Min. C)

An elementary school teacher brings conservation to her classroom.

POLLUTION AND HABITAT DESTRUCTION

"Cry of the Marsh" (17 Min. C)

Marshland destruction and its devastating impact on wildlife is the message of this film.

"George Washington's River" (28 Min. C)

This important film about pollution in the Potomac River and graphically portrays the evils of pollution while pointing out that there are sound methods for cleaning up our rivers.

"Land of the Prairie Ducks" (26 Min. C)

A factual and forthright presentation of the duck situation in North America. It tells what has happened to what was once the greatest duck-producing area on the continent and suggests what must be done to preserve that which remains.

"Marshland Is Not Wasteland"

The story of coastal marshlands and their value in our world today.

"So Little Time" (28 Min. C)

This film shows the waterfowl in North America, with some 30-plus species seen.

"The Gifts" (28 Min. C)

The rivers and lakes of America no longer run free and clear and this hard-hitting film shows just how extensive is the pollution of our waterways.

"The Persistent Seed" (15 Min. C)

A searching look at the destructive influence of man on his environment.

WATER SAFETY

"Boats, Motors, and People" (17 Min. C)

Designed for education as well as entertainment, this movie deals with the safe operation of outboard boats.

"Outboard Outings" (17 Min. C)

This film highlights safety precautions that should be observed, the boater's rules of the road, fair and foul weather boating techniques, and similar pointers designed to make your use of America's lakes, rivers, and coastal waters a safe and pleasant experience.

"Suddenly Upon The Waters" (27 Min. C)
This film illustrates the importance of courtesy and safety for all people who use the waters of America.

"Water Wisdom" (23 Min. C)
This safety film should be seen by everyone who participates in boating, fishing, or water sports.

Audio-Visual Center
Indiana University
Bloomington, Indiana 47401

"Of Time, Work and Leisure" (20 Min. B & W)

"Marshland Is Not Wasteland" (14 Min. C)

"Camping - A Key to Conservation" (23 Min. C)

Athletic Institute
Chicago, Illinois 60654

"Town and Country Recreation" (20 Min. C)

"Careers in Recreation" (27 Min. C)

Lifetime Sports Foundation
1725 K Street N. W.
Washington, D. C. 20006

"Classrooms in the Park" (15 Min. C)

National Recreation and Park Association
1700 Pennsylvania Avenue, N. W.
Washington, D. C. 20006

"Financed Recreation" (22 Min. C)

Bailey Films, Inc.
6509 Delougpre
Hollywood, California 90028

"National Parks - Our American Heritage" (17 Min. C)

Stanford University
Stanford California 90028

"Recreation Center for the Handicapped" (21 Min. C)

APPENDIX D

Manager, Public Documents Distribution Center
5801 Tabor Avenue
Philadelphia, Pennsylvania 19120

The following are recommended conservation and environmental yearbooks printed by the U.S. Department of the Interior:

"Our Living Land" (s/n 2400-0613) $2.00 per copy
Weighs the good and bad that come from man's incursion on the American landscape and probes the question of how to make amends for damages done.

"River of Life" (s/n 2400-0537) $2.00 per copy
The story of water and the Department's effort to develop it for man's use and to protect it from abuse.

"It's Your World" (s/n 2400-0447) $2.00 per copy
Gives examples of grassroots conservation efforts to improve the nation's environment.

"Man - An Endangered Species?" (s/n 2400-0446) $2.00 per copy.
Sounds an alarm over the continued destruction of the human habitat.

"The Third Wave" (s/n 2400-0445) $2.00 per copy
Analyzes the new ecological approach to conservation.

"The Population Challenge" (s/n 2400-0444) $2.00 per copy
Examines the environment stress created by population growth.

"Quest for Quality" (s/n 2400-0444) $2.00 per copy
Describes the kind of natural world we seek to build.

"Clean Water - It's Up to You" (Free Copies)
Izaak Walton League of America
1326 Waukegan Road
Glenview, Illinois 60025

"What You Can Do About Water Pollution" (10¢ each)
Superintendent of Documents
U.S. Printing Office
Washington, D. C. 20402

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

Room 408 Albemarle Building
Raleigh, N. C. 27602

Publications:

"Wildlife in North Carolina" (monthly magazine, $1.00 per year)

BIRDS

- "Bird Furniture"
- "Bluebird Special"
- "List of Native Plants and Shrubs that can be Planted for Bird Food"
- "Summer Birds in Your Backyard"
- "Winter Bird Feeders"
- "Winter Birds in Your Backyard"

FISH

- "Carp in North Carolina"
- "Cricket Culture"
- "Fish Facts"
- "Fishing North Carolina Waters"
- "How to Raise Fishing Worms for Bait"
- "Largemouth Bass in North Carolina"
- "Rainbow Trout in North Carolina"
- "The Bluegill in North Carolina"
- "The Catfishes"
- "The Crappie in North Carolina"

GAME BIRDS AND ANIMALS

- "All About Wildlife"
- "Build a Wood Duck House"
- "Life History and Management of the Beaver in North Carolina"
- "Management of the Bobwhite Quail in North Carolina"
- "Management of the Eastern Cottontail Rabbit in North Carolina"
- "Management of the Muskrat in North Carolina"
- "Management of the Ruffed Grouse in North Carolina"
- "Management of the White-tailed Deer in North Carolina"
- "Management of the Wild Turkey in North Carolina"
- "Our Wildlife Neighbors"
- "Squirrel Box Plan"
- "The European Wild Boar in North Carolina"
- "The Squirrel (Fox and Gray)

MISCELLANEAOUS

- "Boating North Carolina Waters"
- "Don't Eat the Daisies"
- "Ecology Reprints"
- "Safety for the Hunter"
- "So You Want to Pick Flowers!"

National Medical Audiovisual Center (Annex)
Station K
Atlanta, Georgia 30324

AIR POLLUTION (Free Films)

"Don't Leave It All To The Experts" (No. M-1739)
"Beware the Wind" (No. M-1707-X)
"Beware the Wind" (No. M-1707-X)

"The Run-around" (No. M-1774-X)

"On A Clear Day You Can Almost See Terminal Tower" (No. M-1712-X)

"The Poisoned Air" (No. M-1418-X)

"Air of Disaster" (No. M-1419-X)

"Something In The Air" (No. TFR-1308-X) B & W

"With Each Breath" (No. M-1430-X)

"Ill Winds On A Sunny Day" (No. MIS-984)

"This Business Of Air" (No. M-1420-X)

It's The Only Air We've Got" (No. M-1431-X)

"A Matter of Attitudes" (No. M-1530-X)

"Air Pollution: Take A Deep Deadly Breath"
  Part I (No. M-1540-XA)
  Part II (No. M-1540-XB)
  Part III (No. M-1540-XC)
  Complete (No. M-1540-X)

"Pollution" Song Musical Parody (No. M-1529-X)

"A Day At The Dump" (No. M-1600-X)

"Air Pollution In the New York-New Jersey Interstate Area" (No. M-1624-X)

"Beward of Ill Winds" (No. F-1745-X) 35mm filmstrip

"Air Pollution And You" (No. F-1528-X)

Films should be requested at least two weeks before showing dates. Order films by title and order number.

REGULATIONS

"Designated Public Mountain Trout Waters"
"Motorboat Regulations"
"North Carolina Fishing Rules"
"North Carolina Game Lands"
"North Carolina Hunting and Trapping Regulations"
"North Carolina Motorboat Owner's Guide"
"North Carolina's Boating and Water Safety Law"
"North Carolina Statutes on Game, Fish and Boat Laws"
"Regulation Standards for Facilities Used in Holding Legally Acquired Wildlife in Captivity"

Luther Partin
N. C. Wildlife Commission
408 Albemarle Building
Raleigh, North Carolina 27602

1. Hunter Safety Directors - will be available for gun safety instruction.

2. Water Safety Teams - available for class instruction.

Association Films
600 Grand Avenue
Ridgefield, N. J. 07657

FILMOGRAPHY

"Glen Canyon" (29 Min. C)
Demonstrates how the beauty of the canyon was destroyed when the dam was built and stresses the need to conserve the remaining canyons.

"Grand Canyon" (26 Min. C)
Explores the secret crannies of the canyon and unveils its living geology. An argument is presented against the construction of dams and for the inclusion of the whole region in a National Park.

"Island In Time: The Point Reyes Peninsula" (16mm Film Optical Sound/28 Min. C)

"Nature Next Door" (25 Min. C)
Professor C. Stebbins explores Berkeley's Tilden Regional Park in order to demonstrate the importance of ready access to natural land and wildlife for children.

"No Room For Wilderness" (25 Min. C)
Examines the fundamental nature of ecology and indicates the relationship of primitive man to his environment through the use of African examples. Demonstrates the disruptive impact of civilization and the need to preserve the wilderness, and pleads for world population control.

"The Redwoods" (20 Min. C)
Surveys the future of a vanishing forest of Sequoia Trees

"Wasted Woods" (15 Min. C)
Documents the destructive logging carried on in the Northwest.

"Wilderness Alps of Stehekin" (28 Min. C)
Surveys the Cascades lying north of Stevens Pass in Northern Washington.

"Wilderness River Trail" (28 Min. C)
Explores the Yampa and Green River trails of the Dinosaur National Monument during a float trip.

Carousel Films, Inc.
1501 Broadway
New York, N.Y. 10036

"Bulldozed America" (25 Min. B & W)
Explores the problem of vanishing natural beauty of the U.S. as a result of the construction by commercial interests. Interviews with William O. Douglas and Stewart Udall are included.

"Poisoned Air" (50 Min.C)
16 mm Film Optical Sound. Secretary of Health, Education and Welfare, John W. Gardner discusses methods of dealing with pollution with representatives of the automobile and petroleum industries.

"Population Explosion" (43 Min. B & W)
Considers the consequences of the abnormally high population expansion of the world, citing India as an example of overpopulation and inadequate food resources.

"Water Famine" (54 Min. B & W)
Explores the problems of water shortage and pollution.

Coronet Films
65 E. South Water St.
Chicago, Illinois 60601

"Aqua Folly" (29 Min. C)
Discusses the growing national water problem and illustrates proper water control, management and use in soil, forestry and wildlife conservation.

"Conserving Our Soil Today" (11 Min. C)

"Conserving Our Wildlife Today" (11 Min. C)

APPENDIX E

SUGGESTIONS AND PROCEDURES IN DEVELOPING NATURE TRAILS

OUTDOOR RECREATION AND APPLIED ECOLOGY I 7060

OUTDOOR RECREATION AND APPLIED ECOLOGY II 7061

DIVISION OF OCCUPATIONAL EDUCATION

AGRICULTURAL EDUCATION SECTION

DEPARTMENT OF PUBLIC INSTRUCTION

RALEIGH, NORTH CAROLINA

REVISED

SEPTEMBER 1974

PREFACE

The purpose of this booklet is to provide information for teachers, administrators and students on how they may plan and develop a nature tail at their school. This nature trail will be one of the teaching-learning stations for "Outdoor Recreation and Applied Ecology" and will be an integral part of the course of instruction.

Fortunately, little expense is required for this excellent educational resource and consultation help is available from: State Department of Public Instruction, Division of Occupational Education and the Division of Science; State Museum (Raleigh); Environmental Education Center, (Oteen); The Soil Conservation Service (Raleigh); The Wildlife Commission (Raleigh); Archives and History Commission (Raleigh); The N. C. Extension Service (Raleigh).

We are especially appreciative to the following persons who are most responsible for materials in this booklet:

(1) Alan Lenk, Environmental Education Center, Oteen, N. C. for the materials through page 11, quoted from his publication, entitled, "Developing OnSite Nature Trails."

(2) Eugene Upchurch, State Museum, Raleigh, N.C.

(3) Mitchell Clary, District Soil Conservationist, Waynesville, N.C.

(4) Elmer Graham, Soil Conservation Service, Raleigh, N.C.

(5) Luther Partin, Wildlife Commission, Raleigh, N.C.

(6) Dr. Larry Liggett, Director, Environmental Education Center, Oteen

(7) Paul Taylor, Director, Division of Science, State Department of Public Instruction, Raleigh, N.C.

Teachers and students may add other stations that may be applicable to their geographical location. Also stations may be added as part of the teaching laboratory for other courses as: pulpwood estimation of timber estimation, tree height, ornamental plant as well as hardwood and softwood tree identification for companion courses of Forestry, Pulpwood Production or Ornamental Horticulture.

It is hoped this booklet will be help in planning and laying out a nature trail.

Travis E. Hendren, Consultant
Occupational Programs

N. C. Department of Public Instruction
Division of Occupational Education
Raleigh, N. C. 27611

FOREWORD[1]

That there is a growing concern for the welfare of our spaceship earth can be seen by increased membership in conservation organizations, government agencies to monitor pollution and enforce controls, legislation to crack down on major industrial polluters, pollution control devices for automobiles, and the return of the two-way pop bottle.

These measures are being taken to rectify the damage man has done to his planet and to reshape this country's pollution nightmare into the dream of clean water and clean air for future generations.

The present system of general education has not taught an environmental ethic, a feeling for our mother earth that promotes wise us of our resources and a concern for environmental quality. For this reason, there has been a recent emphasis in ecological education in the classroom, and more importantly, perhaps, a push to involve students in learning experiences outside of the classroom. A nature trail located on the school grounds is one way of providing for an outdoor experience at most schools.

Though nature trails for public use have been around since the late 1800's, their use on school grounds for educational purposes is a relatively new concept.

The nature trail is an important tool for teaching environmental awareness and appreciation. It provides innumerable experiences for observing nature firsthand with all senses employed. It is resource that is available to the entire school and is applicable to all curriculum areas.

Bryon Ashbaugh, the author of TRAIL PLANNING AND LAYOUT, published by the National Audubon Society, lists these positive features of nature trails as they contribute to the following areas:

> Education--provides a stimulating location for learning about the environment. Stresses the scientific method as an educational approach to the solution of environmental problems.
>
> Conservation--provides firsthand examples of cause-and-effect relationships between man and his environment. Calls attention to both problems and solutions in managing natural resources through employment of good conservation practices.
>
> Interpretation--provides realistic examples of the interdependence between living things and their environment. Nature is permitted to "speak" more directly and forcefully.
>
> Research--provides an opportunity for a systematic inquiry into the outdoors through observation and experimentation.
>
> Direction--introduces nature and environmental subjects to the beginner in logical sequence, thus providing for a more stimulating and rewarding experience.

---

[1] The foreword and through page 11 are quoted from the publication entitled, "Developing On-Site Nature Trails," produced by the Environmental Education Center, Oteen, N. C. and edited by Alan Lenk.

Inspiration--provides firsthand experiences for maximum motivation and creative expression.

In addition to the educational value of nature trails, they are inexpensive and can be constructed in a short period of time.

The remainder of this booklet is devoted to the steps and considerations involved in establishing a trail.

TRAIL PLANNING AND DEVELOPMENT

Locating the Trail

Few schools have planned, as a part of their campus, a portion of the grounds to be left in a natural state. But fortunately, numerous schools in the western part of North Carolina have on their property some wooded area that is suitable for a natural study area. Only the most crowded urban schools have been left without such an area, and ironically it is these schools that would probably benefit the most from a nature trail.

It is this wooded area then, so often considered "wasteland" that is ideal for a nature trail. When locating the trail, these things should be kept in mind:

1. As mentioned, a wooded area provides the most potential for a trail, because more points of interest are likely to be found in the woods.

2. When a likely area has been idenified for the inclusion of a trail, it is very important to walk over the area and become familiar with its natural features. Make an inventory, and perhaps a rough map noting things such as:

    a. fallen logs

    b. tree stumps

    c. fungi growth

    d. moss carpets

    e. tree species

    f. wildflowers

    g. fern beds

    h. animal dens

    i. animal trails

    j. bird nests

    k. insect activity

    l. rock exposures

    m. streams

    n. marshes

    o. wood piles

    p. old road beds

q. fences

r. animal tracks

Lucky is the school setting that has all of these points of interest. Most areas have many of them, however, and the problem will be to decide on which features to capitalize. A life science teacher or someone familiar with natural history can easily spot the kinds of things listed above. (A convenient checklist is included in the appendix).

3. The features noted in step #2 will, in a sense, help plan the actual route of the trail Certainly the trail should try to incorporate many of the area's interesting and outstanding features.

Trail Layout

With an idea of the unique features of the area in mind, one can begin to design a path that will use these features as focal points to a better understanding of nature. Here are a few ideas concerned with laying the trail out:

1. Most trails are in the form of a loop, or near circles; they usually end near where they began.
2. Trails should be winding. This suggests anticipating what is around the next bend. Trails should avoid having long straight stretches.
3. The trail length will depend on the amount of space available and the desires and wishes of those involved in its planning.
4. Trails should be one-way with a definite starting and ending point.
5. If land is abundant, a figure eight trail has the versitility of providing two trails in one. Use one half of the eight as the standard loop trail, and the entire figure for longer teaching purposes or activities. Yet another trail design is the spur trail, leading from the main route to a special point of interest and back again.

To lay out the tentative trail route, pieces of string or cloth are helpful as guide markers.

Trail Construction

With the trail marked off through the woods, the next step is to clear the path. In a reasonably mature wooded plot, dense undergrowth should not be a problem to clear. On the other hand, some areas may be choked with underbrush. Clearing will most likely be done by hand, and great care should be taken not to remove or destroy anything that is valuable.

Since it is desirable to have the trail wind about, little has to be cleared in the way of trees, large shrubs, or very dense undergrowth; one can simply go around these obstacles. Going over the trail with a power lawn mower is a good way to establish the trail. If the trail is too steep and rugged to be traveled over with a lawn mower, chances are it is not suitable for comfortable nature trailing.

Other construction considerations that are worth keeping in mind are:

1. It is better that a trail's width be a little too wide rather than too narrow. Students on the trail tend to travel in a group. Also, when stopping at points of interest, it is nice to have room to gather together. Enlarging trails at points of interests will help eliminate trail overflow.

2. Brush and logs cut when clearing the trail provide good wildlife habitat. Leave some in piles along the trail.

3. A trail may invite erosion. If this be the case, erosion control plantings and water diversion devices should be employed immediately.

Interpreting the Trail

Many people are not especially excited by looking at plants or seeing the signs of animal activity in the woods. Appreciation for such things grows through understanding and familiarization with the subject. Here lies the task of interpretation; bringing those things of interest seen along the trail, and the students together, and to make the students aware of the significance of these features. Trail interpretation has been defined as "the problem of bringing the subject matter and audience together and to communicate information and understanding that will make the walk enjoyable and appreciating."

Those features identified earlier, the mosses, ferns etc., are the things worth interpreting. Other things governing the kind of interpretation a trail may have, are:

1. The course of study of the class that will be using the trail. A life science class may wish to emphasize plant and animal life and their interrelationships.

2. The outstanding or dominant features of the trail or trail area, as a thick pine forest or plants along a stream.

3. The special interests of student and teacher.

4. Age level of the students using the trail.

Interpretation of the trail can be handled several ways. Some resourceful teachers can help their students understand the intricacies of nature with little help from anyone. On the other hand, there are teachers who may be interested in having a trail, but do not feel comfortable teaching nature lore, or understand how they may utilize the trail An interpretive booklet, similar to a self-guided nature trail booklet found in National Parks and recreation areas, can be written for the particular trail developed. The booklet corresponds to the special features of the trail and helps explain them. These special features are marked by a signpost or strip of bright colored ribbon, and may be though of a specific stations along the route.

Two examples of interpretation are given below:

A rotten tree stump and a holly tree are just tow of the many features that can be found along nature trails. They may be interpreted in many ways. The following are two examples:

1. Station # 3 A ROTTING TREE STUMP

   How has the removal of this tree affected the forest community?

   Any change in the forest, such as the removal of a tree by logging, affects other living things that are associated with the tree. The squirrels that live there have to find new homes and a new source of food. The cool shade that was once there has been replaced with warm sunlight, which is favorable for grasses and briars that now live here. All things in the forest community are interrelated.

   This kind of interpretation is conceptual in nature. Variety is added to interpretation if concepts are sprinkled between mere identification of the holly tree for example.

2. Station # 7 A HOLLY TREE

   The American Holly Tree is a common evergreen of hardwood forests. It likes moist soil and is often found near streams or river bottoms. Notice the waxy leaves, tipped with sharp spines. Some trees bear red berries that provide food for the many songbirds. Try to spot other holly trees along the trail.

The number of stations included in the interpretive text will depend on the length of the trail and the potential of the are being interpreted. More stations can be put at the beginngin of the trail, when motivation is high, and then spaced farther apart towards the end. The average school trail may have between then (10) and twenty-five (25) stations.

Some general rules concerning interpretive texts are to keep them relatively simple and try to get across one main idea at each station. Interpretation may follow a theme that is evident at each station throughout the trail, or each interpretation may be independent of the others.

Maintenance

Relatively little maintenance is required for a school nature trail. Station markers along the trail should be kept intact at all times. Any litter along the trail should be removed at once. An occasional mowing in the fall or spring will keep unwanted plants from growing in the trail.

It is hoped that the interpretation offered by a leaflet adapted to stations along the trail, and the nature trail itself, will only be the beginning of outdoor study. (A list of outdoor activities applicable to nature trails is found in the appendix).

Ultimately, the success of a nature trail and outdoor education will be decided by the teacher. A nature trail can only add impetus to the concept that a respect for the environment is best taught by direct contact with that environment.

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SIMPLE AS A B C

ARTICULATION

HOW TO USE NATURE TRAILS

ARTICULATION - HOW TO USE NATURE TRAILS

Objectives

The nature trail at the school serves as a guide to bring students, teachers, and school administrators into a healthy and voluntary contact with with nature.[1] If properly used, the nature trail can be an extension of the classroom, to help abstract ideas from books become concrete facts from experiences.[2] (Landscapes are like books which inform us about the condition of our environment. Learning how to read them is a matter of finding out what to look for and how best to interpret your findings.)

Extract from "How To Teach Science Through Field Studies" by Millard C. Davis.

Reasons for using environment:

1. Favorable attitudes toward the environment and informed participation in the environment may be attained when students understand ecological principals illustrated in the environment.

2. Field studies help develop an aesthetic appreciation of our natural environment and a desire to keep it beautiful.

3. Recreational and attitudinal values are developed through study of environment.

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[1] Wilcox, Arthur T., "Nature Trail Outline." Park Education Program, MSU.

[2] Davis, Millard C., "How To Read The Natural Landscape In Forests and Fields," National Science Teachers' Association.

- Patterns in nature. A careful eye can see many different patterns in nature. A vine grows in a spiral around a tree. The annual rings in the cross-section of a cut log form concentric circles. Have students try to find patterns along the trail that take the shape of circles, spheres, concentric rings, squares, triangles, etc. They should record the object from which they got their findings with others.

- Making rubbings of objects is a popular and enjoyable art form. Simply stated, it involves placing paper over an object to be rubbed, then moving a crayon or similar instrument back and forth over the paper so that an image is formed. Have students make rubbings or textures found in the woods. Let them make texture collection, using rubbings, of different trees. Write on the finished rubbing the kind of tree used. Display aroung the school.

- Take students on a silent walk through the woods. At a given signal, everyone is required to stop and listen for one minute (assign the child with a watch to be a timer) How many different sounds can be heard on the trail at different listening points? How are some sounds like others, and how are some different and unique? Do some evoke certain emotions? A portable tape recorder will add interest to the whole affair.

- A dogwood blossom by any other name smells the same. Make a list of all the different smells that come your way as you walk through the woods. See if you can discover the source of the odor and identify it.

- Have students lead each other blindfolded over a level portion of the trail. Have them discuss or write about what they "saw" blindfolded.

- Before going outside, compose a "touch list" with the students. These are words that describe how things feel, as with the word "rough". With a list of several such words in hand, the mission is to find objects in the environment that these words describe. For example, the word "rough" would match up with bark of an oak tree. This would be recorded as: rough - - bark of oak, and so on for each descriptive word on the list.

Activities That Involve Writing Skills

- A good subject for a story is a treehouse. Students can compose a short story around some aspect of a treehouse, or the inhabitants and their lives.

- For use in descriptive writing, have students pick an object to study along the trail. Have them examine its every detail, and store what they have seen in their minds. Upon returning to the classroom, they are to write a poem or descriptive paragraph about their subject. It will be interesting to see how much detail they remember, and how interesting they make their compositions. The seemingly simple objects in nature offer the greatest challenge to the writer.

- A bird's eye view of the world is entirely different from ours. We always are looking up at trees; birds often see them from above. We walk between tree trunks, and they hop from limb to limb. Let the student's imagination fly away, and suggest they compose s story from a bird's eye view. What is life like from the perspective of a bird's world?

- Trees are the longest lived and tallest life forms on earth. Within the course of 100 years of life, trees "see" many changes around them. Many fall victim to clearing and logging. Let students write about my "My Life As a Tree, 1895-1972", and suggest they relate experiences in "their" lives.

Science-Math Activities

- If there are sawed logs in the area or tree stumps left from logging, assign a group of students the task of aging the tree by counting the annual rings. Have them consider things like the size of the tree when they were born, or its size when the school was built. Rings that are close together, indicate a year of slow growth. Have some students check to see if close rings coincided with a dry year in the area.

- Trees are the dominant plants in the woodland areas. A point of discussion can be centered around how man interacts with trees (trees produce oxygen and we exhale carbon dioxide). What other ways does man interact with trees? (Building materials, foods, synthetic materials derived from trees, turpentine, etc.,)

- How do trees interact with animals found in the woods? Have students divide into groups to observe the animals they see in and around trees. Remind them to look at the entire tree from the ground up. Keep a list of any animals, from insect to raccoon, and the group that has observed the most associations wins.

- In the spring of the year, have students transplant plants from around their homes to the nature trail area. They should record how the plant progresses, if it grows at all. If their transplanting is unsuccessful, suggest that perhaps the new environment may not have been favorable for the plant's growth. Did the area where it was uprooted from match the area into which it was transplanted?

- Chances are that near the trail, or on a roadcut near the school, there will be a plant call kudzu. This broad leafed, vine-like plant used extensively by highway departments to cover roadbanks and prevent erosion, has now become a pest in many areas. It has the capacity to engulf a forest and literally cover up trees depriving them of light. The unexpected effects of this plant forms a good basis for discussion on man using certain plants in new areas for new uses when he does not fully understand how the plant lives and grows. An example with animals in the Starling, a bird first introduced in New York.

- An activi[illegible]lving measurement is to see which trees have the largest canopy of foliage area. Students can walk around a tree directly under the outmost limits of the farthest branches. The diameter can be measured with a yardstick, and the are figured by the formula $A= r^2$.

- Investigate how a grasshopper jumps. Measure the distance of five jumps, See if the angle of take off can be determined. Different grasshoppers jump different distances. Calculate jumping distances for two or three species. Become an expert on "hopper hopping."

- To an interested student, assign the task of finding out what animals compose the food chain of the local area. With a piece of paper in hand, he should record every animal that he sees. Then arrange the animals (and some plants, perhaps) into a workable food chain, using the list of animals seen, and arrows to indicate who eats whom. An example of a simple food chain is: blade of grass → grasshopper → small bird → red tailed hawk. Later, transfer the information to a larger piece of paper for display and explanation.

- Acquire a few thermometers and let a group of students check temperatures at various places on the school grounds. Comparisons should be made between

* one location and the next. Some of the areas they might check are: on the playground, in the woods, next to the school building, an inch under leaf litter, on the shaded side of a tree and sunny side of the same tree.

* If a stream flows through the school grounds, have some students find out where it comes from and where it is going. If a small plastic boat were to be placed in the stream, which waterways would it flow through on its journey to the ocean. Maps will be needed for this one.

Social Studies Activities

* Have students draw up a land use ordinance. This nature trail "Bill of Rights" will decide how the nature trail is to be used and protected. Guidelines on collecting specimens, rules on littering, and conduct are things to include.

* After the students have become thoroughly familiar with the nature trail and the surrounding area, use any medium available (clay, paste, paper mache, etc.,) to make a relief map of the area and trail. Some students may want to make different kinds of maps of the area.

* Have students survey the area with the idea of trying to discover how the land may have been used in the past. Since the area will not be a virgin forest, one knows that the forest must have been logged at one time and is now recovering. Fence rows, rock piles, perhaps the remains of a house foundation, are clues to the history of the area.

* Somewhere along the trail there are likely to be ants or termites. These insects have social structures that are highly organized and regimented. After some research at the library and actual observation on the trail, students can compare the insects' social structure to the social structure and government that we live under.

* Let a group of students write and plan a puppet show at a study site on the trail using animated characters such as animals, flowers, trees, etc. Put these characters in a situation where there habitat is threatened by a forest fire or highway right-of-way and have them express their feelings to the audience.

* Show the students some of the building designs by architect Frank Lloyd Wright. Then let them design a building that will be built in the nature trail area, but it must blend into the surroundings as much as possible. It may be a home or an apartment house. Organize a judging committee to decide on the best design.

* Are the animals that live in the woods around the school, the same animals that have always lived there? Are there any that were once native to the area but have become extinct? Have there been new animals introduced? For anyone interested in hunting or endangered species, these questions may be of interest.

We should
Care for our
Wildlife!

STATIONS - EXHIBITS
AND
DEMONSTRATIONS

A NATURE TRAIL is one of the most effective methods or providing opportunities for learning experiences in the outdoors. Where possible a trail should be included and will probably be the dominant feature in most outdoor classrooms.

Following are some ideas and examples being used in other areas that may be useful to you.

Geology Trail Helps to explain the composition of the earth's surface and how its various features were developed. It contains a geology wall which is simply a stone wall topped by large specimens of the principal rocks and minerals found in the area.

Brook Trail Follows a stream to point out such things as the action of water as a soil builder, the power of water in soil erosion, and importance of the surrounding watershed. It illustrates several types of habitats for plants and animals and leads past such watery environments as rapids, slack water and pools.

Water's Edge Trail Follows along the edge of a large pond, lake, or river and points out the transition between and water. In the case of a small pond the trail could go around the body of water and over it by means of a raised walkway and bridge which would permit extensive observation without destruction of the habitat.

Wood Trail Shows by states, the natural steps in plant succession, particularly from an open area or glade to climax forest. It also leads past forest types which exhibit certain characteristics of light tolerance; e.g. sun-tolerant hardwood to shade tolerant types such as hemlock and white pine.

Timber Trail Leads through deepest and oldest woods. Leads past heavy timber and points up the improtance of natural forest cover in watershed protection -- also mature and straight trees as producers of timber. Trail should lead through areas under forest management and past sites that explain the importance of forest protection, fire prevention, and the effects of shade, humidity, and temperature upon forest growth.

Soil Trail This trail is chiefly designed to illustrate the various factors in the formation of soil. It also show the effects of thawing, freezing, and weathering on soil. It shows how lichens, mosses and ferns, grass, shrubs and trees, and animals affect the soil land area related to it. A soil profile is especially useful.

Animal Shelter Trail Shows homes, nests, and dens of wild animals. During proper season the trail leads past features which tell the story of hibernating animals. Nest boxes for different species can be erected in areas of suitable habitat.

Farm Trail Leads past cultivated lands showing good farm practices. Such features as stripcropping, contour furrowing and cultivation, crop rotation, terracing, soil cover, etc., are all excellent soil conservation practices that should be demonstrated to the visitor.

Marsh Trail An exciting trail that takes the visitor alongside and through as well as over a marsh. The later can be done by a footbridge. Here, through proper signs or explanation by a guide, the fascinating story of the relationship of land to water levels can be told.

Historical Trail This trail takes advantage of such manmade activities as mines, furnaces, charcoal pits, sawmills, battle fields, and Indian villages. It relates the history of the area to man's use of the local natural resources.

OUTDOOR DEMONSTRATION AND CHARTS

Bird Feeder and Bath Area Many people travel long distances by car or afoot to see birds. Yet, you can bring birds to your nature center or home by providing them with water and the right kinds of food. Such a bird cafeteria would be ideally situated if it were placed outside a picture window at the main building. It is now a feature at several nature centers.

Nature by the Square Yard A small square plot of ground (one yard square) can be fenced in an open field, edge of woods, or in deep woods. Here the different kinds of plants can be identified by using a crossbar with labels above the plot, with strings from each suspended label leading to a peg beside the plant described.

Snake Pit Beds of concrete and stone can be constructed to form a circle 20 feet in diameter, with a rail fence to keep visitors back at a safe distance. The pit should have inverted walls and contain a water-filled moat to prevent the snakes from escaping. A stone island, 8 feet in diameter provides a place for the snakes to sun themselves and be observed. This exhibit can play an important role in demonstrating the value of snakes and the difference between poisonous and non-poisonous varieties.

Turtle Pond This includes a shallow pool with islands of stone and cement. Overhanging rocks are carefully placed and cemented together so as to provide an insurmountable barrier to the turtles, thus eliminating the need for a wire fence.

Geology Wall This is simply a low stone wall with various local rocks and minerals cemented on top and properly identified and labeled with nearby signes. Fits in very well along a geology trail.

Observation Platform This is merely an elevated wooden or stone structure where individuals and groups can gain a clearer view of the local countryside. It can also be used for bird study by day and for astronomy studies at night.

Botany Pool A 6' x 15' pool can be cleared out in a wet area and certain aquatic plants attracted to it or planted for special study. These include water lilies, cattails, pickerel weeds, arrow leaf and rushes, with liverworts and others water-loving plants along the edges. This pool could be part of the water's edge trail.

Soil Profile A profile showing the different layers of soil can be demonstrated with a pit to be dug in cross-section fashion at the side of a bank. The various layers of soil that can be shown include:

> "A" horizon - a darkly colored layer containing a relatively high content of decayed plant materials mixed with mineral matter. This horizon may be missing due to erosion.
>
> "B" horizon - layer in which the more soluble minerals accumulate as they wash down from above to meet the weathered and broken parent material.
>
> "C" horizon - paren material -- may be bedrock or glacial deposit which has been relatively unchanged.

Tree Stump A sloping cut on top of a tree stump could be smoothed and waterproofed. A simple method is to repeatedly paint the exposed surfaces with *Polyglycol E 1000 (Dow Chemical)* and *(Monsento)* solutions. The two preservatives should be used alternately with drying time between each application.

Bee Tree A bee tree can be created at a nature center by placing a swarm of bees in the natural crevice of a hollow tree, if a wild bee tree cannot be found. In this type of project, it might be possible to get technical assistance from a professional beekeeper.

Plant Succession This is a demonstration area showing the various stages of plant succession, starting with a clear-cut or denuded plot of ground going all the way to the higher stages of tree growth. The important stages to be shown are:

1st stage - for a short period of years, annual and perennial weeds and grasses.

2nd stage - shrubs such as sumac, birch, sassafras, blackberry, and cherry, would grow and condition the soil still further.

3rd stage - trees such as red maple, tulip, and pines would grow and provide shade necessary for the next stage.

4th stage - oaks and hickories, with some beech and ash, would grow and continue to reproduce themselves unless prevented by fire or man.

Weather Station Demonstration A complete weather station is extremely important in helping to interpret the weather of the area and is a worthwhile complement to the equipment of most schools. The station provides valuable local and up-to-minute information to many groups in the community. The U. S. Weather Bureau has established cooperative weather stations in many parts of the country by providing instruments and housing. It is possible that this would be done for your community as a part of a center's program because of the importance of local weather information.

Shelterbelt Demonstration A suitable area can be planted with willows or pines to demonstrate the shelterbelt protection on wet and dry sites.

Grass Demonstration A special plot of ground can be seeded to various types of erosion control grasses. These should be properly labeled and described.

Photographic Blind Several blinds can be constructed to native materials overlooking different habitats for special observations, study, and photography. Good places for blinds are shorelines, mud flats, marshes, ponds, and bays.

Elevated Walkway A walk constructed on driven poles can carry observers over a marsh, mud flat or water's edge. This permits extensive observation of the littoral zone by many people without any destruction of the habitat.

Soil Samples A sample of local soils can be put into bottles with a chart showing sources and values.

Insects of Area Collection of mounted specimens along with charts of life histories.

Grafting Demonstration A grafted tree or shrub can illustrate the dramatic method of tree propagation, which is fast beoming a lost art.

Garden Plots Youngsters can be taught some basic skills in soil preparation, plant propagation, cultivation, and harvest by observing a small growing garden. All work can be done by the children through prior planning and arrangements.

Christmas Tree Plantation Plot can be planted to Christmas trees such as Scotch Pines. This area can be worked by local teenagers thus teaching them something about forestry.

Overlooks Natural observation points can be cleared or marked from which to view natural features, conservation practices, and historical settings.

Council Ring This is a small assembly area made up of logs where a group can be seated and given instructions on the local natural features of the center. Logs should be placed in a semi-circle with a short log at the base for the instructor. The council ring can also be used for campfire programs.

Honey Bee Chart This is an outside chart telling the life history of the honey bee, including the bee's technique of making honey and wax. An observation beehive would be part of the exhibit.

Forest Apartment House Chart A simple outside exhibit can be made which shows, in chart form, how a forest is much like a five-story apartment house. Chart shows soil, mosses, ferns, and wildflowers, shrubs, and trees. From the humus on the ground to the leaves in the highest trees, animals of different types find food, shelter, and homes.

Insect Homes Chart An outside exhibit with chart can show the various types of insect homes. Where possible, natural materials should be used.

Soil is Alive Chart This is another outside chart displaying the live things found in one cubic foot of soil. The various plants and animals can be preserved and shown in jars.

Wood Types A board mounted with pieces of wood from different species of trees is helpful in teaching differences in woods and uses (hardwoods, softwoods, grain patterns, etc.)

Tree Growth Cross-section cut from trees of the same age but of different sizes can be helpful in showing differences in growth due to competition, site, etc.

Plant Mounts A file of plants, leaves flowers and fruits mounted on cardboard under adhesive, clear plastic is useful in teaching the species commonly occurring in the area. Cellulose acetate plastic sheets .005" in the thickness mounted on white cardboard with a relatively "slick" surface for good adhesion makes a good mount. The cardboard must be sufficiently thin and pliable to take the impresison of thick portions of plants. A type that has been used successfully is .018" thick.

Following is a list of publications available for study:

Ashbaugh, Byron L., "Trail Planning and Layout," pp. 101, National Audubon Society, 1130 Fifth Avenue, N. Y. 10028, 1965, Price $2.50.

Shoman, Joseph J., "A Nature Center for Your Community," pp. 40, National Audubon Society, 1962, Price $1.00.

Shick, Harold, "Nature Trails," Circular E-10, pp. 6, Cooperative Extension Service, Michigan State University, East Lansing, Michigan.

Conservation in Miniature Exhibit Demonstrate conservation principles. On a slope of 10 to 15 percent, six or eight 1/100 or 1/200 acre run-off plots can be laid out (measuring 10 x 40' and 4' x 20' respectively). Boards are used to separate the plots and a catch basin is constructed at the bottom of each plot to trap any soil that moves with the run-off water. Various plants are planted in the plots to demonstrate the soil-holding capacity of each. The main plots to demonstrate are: 1) no cover, 2) gras[illegible] 3) row crops on contour, 4) strip crops, 5) straight rows, 6) diversion terraces.

Pioneer Implements Hundreds of old turning plows, harrows, corn planters, and many other implements are stored in sheds in practically every county in the country. Many could be obtained at little expense. These would be useful in teaching history and social studies.

Erosion Control Students can undertake various erosion control projects on trails, steep slopes, stream banks, etc.

Stream and Watershed Points of interest might include the action of water as a soil builder, the power of water in soil erosion, the importance of the surrounding watershed, several types of habitats for plants and animals and such watery environments as rapids, slack water, and pools.

A stream is an ideal illustration of a miniature watershed. Discussion points might include the area of the watershed and how rain falling within the watershed runs into the stream while that falling outside the watershed boundary runs into other waterways. The cubic feet per second flow of the stream, the retardation of runoff by vegetation in the watershed, the movement of soil by the stream and deposition of the soil in slack areas where the water slows down are important points of interest. In the area of deposition, attention can be directed to the fact that the heavier soil particles are dropped first and lighter particles last.

Sundial The basis of time and other facts in astronomy can be illustrated by an inexpensive sundial. The construction of a sundial is an ideal project for children since one can be easily built from inexpensive materials. Complete directions and plans can be found in Circular 402, *Sundials*, U. S. Government Printing Office, Washington, D.C. 20402 Cost is 5¢ per copy.

Southern Alamance H. S. - Alamance County

NATURE STUDY IN A SUMMER RECREATIONAL PROGRAM

OBJECTIVES: To develop awareness
To develop sensitivity
To have fun

It is suggested that activities be kept simple, that participants become involved, and participants be made aware of what they should observe and/or learn in a session.

SOME ON-SITE ACTIVITIES

1. Simple Observation
2. Bird Watch
3. Wildlife Watch (other than birds)
4. Quadrant Studies
5. Nature Films -- N. C. Wildlife Resources Commission Raleigh, N. C.
6. Tree Identification
7. Hikes
8. Outdoor Cooking
9. Use of Fishing Equipment (Demonstration)
10. Safe Gun Handling (Demonstration)
11. Tent Pitching (Demonstration)
12. Other Camping Equipment, i.e., stove, lantern, open fire, Point out safety practices.
13. Erosion
14. Erosion Control
15. Soil Profile
16. Rock Formations (land and water)
17. Plant Succession
18. Forest Floor
19. Different Environments
    a. Upland (hills)
    b. Bottomland
    c. Swamp or marsh areas
    d. Streams and lakes
20. Plant Identification
    a. Poison Ivy
    b. Virginia Creeper
21. Read Aloud Sessions
    a. The Lorax, Dr. Seuss
    b. Etc.
22. Resource People

The Ecology classes have been working this year on a nature trail for Crest and neighboring schools. We hope you will be able to bring your classes to visit the Nature Trail.

We think the Nature Trail will provide:

(A) The opportunity to develop an awareness of the ecological relationships which exist among living things.

(b) Students and other interested individuals and/or groups the opportunity to experience nature through direct contact with the environment.
(C) An opportunity to develop sensitivity and appreciation of nature.
(D) The student with building blocks for his or her individual "Save the Environment" program.

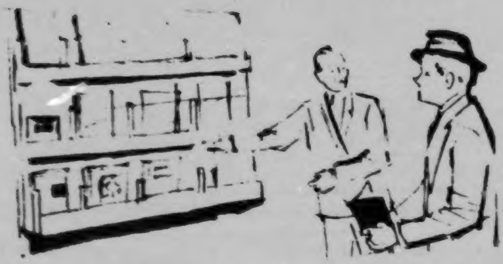
The Nature Trail has an outdoor classroom and such natural features as:

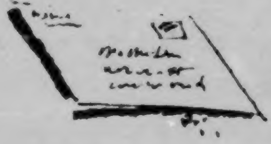
(A) Wildlife
(B) Fallen logs
(C) Tree stumps
(D) Fungi Growth
(E) Moss carpets
(F) Tree species
(G) Wild flowers
(H) Fern beds
(I) Animal dens
(J) Animal trails
(K) Bird nests
(L) Insect activity
(M) Rock exposures
(N) Streams
(O) Marshes
(P) Wood piles
(Q) Fences
(R) Animal tracks

We would like to suggest some ways that you could enjoy the Nature Trail to the fullest extent, and ask that you please leave it the way you found it for the next group.

(1) Keep your group together at all times.
(2) Discourage littering (PLEASE)
(3) No smoking
(4) Discourage taking any materials from the nature trail area, such as ferns, moss, rocks, sticks, plants, animals, insects, etc.
(5) We would urge that you take time at each station to read signs and give students time for questions.

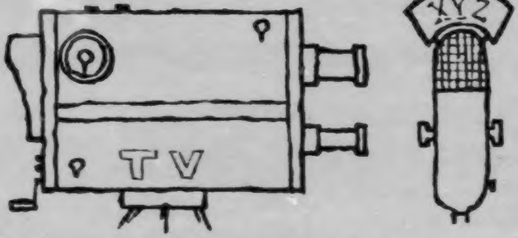
We would like to have you visit Crest Nature Trail and would be glad to have one of our students serve as a guide to help you with any questions you might have.





SOURCES FOR ENVIRONMENTAL EDUCATION AIDS

INTERESTING
UN-USUAL
NEAR TO READER
NEW, RECENT, TIMELY
IMPORTANT
HAPPEN-INGS



ENVIRONMENTAL EDUCATION AIDS

1. National Audubon Society
   1130 Fifth Avenue
   New York, New York 10028

   Nature Center Portfolio - includes following which can be purchased separately:

   A Nature Center For Your Community, $1.00
   Planning a Nature Center, $2.00
   Manual of Outdoor Conservation Education, $2.00
   Trail Planning and Layout, $2.50
   Wildlife Habitat Improvement, $2.50
   Manual of Outdoor Interpretation, $3.00

2. Boy Scouts of America
   Supply Division
   P. O. Box 521
   North Brunswick, New Jersey 08902

   Ecology and Nature Trail Signs - sets of 5 1/2 x 7" weather-resistant cards, suitable for use inside or out. May be used as samples on actually put up as trail labels, $4.00 each - 80-card set

   No. 7167 - Ecology Signs
   No. 12029 - Northeastern and Midwestern States
   No. 12030 - Southern and Gulf Coast States

3. North Carolina Wildlife Resources Commission
   P. O. Box 2919
   Raleigh, North Carolina 27602

   Wildlife in North Carolina - monthly magazine, $1.00/year.

   NCWRC has a series of informational pamphlets (single copies free) about various fish and wildlife species in North Carolina:

   Bird Furniture
   Summer Birds in Your Backyard
   Winter Birds in Your Backyard
   The Catfishes (by J. H. Cornell)
   Carp in North Carolina (by J. H. Cornell)
   The European Wild Boar in North Carolina
   Management of the Ruffed Grouse in North Carolina
   Management of the Wild Turkey in North Carolina
   Management of the Bobwhite Quail in North Carolina
   Management of the White-tailed Deer in North Carolina
   Management of the Eastern Cottontail Rabbit in North Carolina
   Rainbow Trout in North Carolina (by J. H. Cornell)
   The Crappie in North Carolina
   Life History and Management of the Beaver in North Carolina
   Management of the Muskrat in North Carolina
   Facts About Fishes (by Darrell E. Louder)
   Largemouth Bass in North Carolina (by Duane Raver)

4. State Museum - Eugene Upchurch
Box 2281
Raleigh, N. C. 27602

Information Sheets:

"So You Want to Pick Flowers?" (by W. L. Hamnett) - Information on N. C. Wildflowers

"List of Native Plants and Shrubs That Can Be Planted For Bird Food" (by Zora S. Jensen)

"Some North Carolina Fresh-Water Fishes" - color pictures and information on 39 species - 40¢

5. Soil Conservation Society of America
7515 N.E. Ankeny Rd.
Ankeny, La. 50021

Series of comic-style booklets:

- The Story of Land
- The Wonder of Water
- Help Keep Our Land Beautiful
- Making a Home for Wildlife on the Land
- Food and the Land
- Working Together for a Livable Land
- Plants -- How They Improve Our Environment

6. National Association of Conservation Districts
Service Department
P. O. Box 855
League City, Texas 77573

Environmental Action Guide ($5.00/hundred) - Bibliography on conservation and the environment.

Environmental Film Service - Catalog of 16mm sound films on conservation subjects ($3.00 - $5.00 service charge.)

7. Environmental Education Center
13 Veterans Drive
Oteen, North Carolina 28805 (704) 298-3707

- Director, Dr. Larry Liggett
- Staff to assist in environmental education in Western North Carolina
- Working primarily in schools in Madison, Buncombe, Haywood, Henderson, Jackson, Polk, and Transylvania Counties.
- Has resource material for teachers, will present programs in schools, and is in the process of developing an outdoor classroom area.

8. U. S. Forest Service
Southern Region

Information Kit

9. Soil Conservation Service

Information Adi No. 11 - Suggestions for features that might be included in Outdoor classrooms

Information Aid No. 10 - Outdoor Conservation Classrooms - Information to aid in developing Outdoor Classroom

Conservation Facts Packet - Useful to distribute many of the SCS publications useful in conservation education.

Area I - Nature Trail Ideas
- Slide Program on Outdoor Classrooms

10. North Carolina Department of Public Instruction
Raleigh, North Carolina 27600

"Teachers' Guide for Environmental Education"

11. Plant Mounts for identification and study - a file of plant leaves flowers, and fruits mounted on cardboard under adhesive, clear plastic is useful in teaching the species commonly occuring in the area.

You may find the adhesive acetate locally or it can be ordered from:

IDEAS AND NOTES
Outdoor Recreation and Applied Ecology Workshop
Charles D. Owen High School, Swannanoa, North Carolina

1. NORTH CAROLINA PUBLIC SCHOOLS, a publication, Vol. 37, No. 4, Summer 73, see p. 3, p. 13, Write: Editor, N. C. Public Schools
Division of Public Information
Room 352
State Department of Public Instruction
Raleigh, N. C. 27611

2. Catalogs: Ben Meadows Company (forestry and engineering supplies)
P. O. Box 8377 Station F
553 Amsterdam Ave., N.E.
Atlanta, Ga. 30306

3. Books: Yearbook of Agriculture
1971 -- A good Life For More People
1972 -- Landscape For Living

THE NEW YORK TIMES
Encyclopedic Dictionary of the Environment - $10.00
by Paul Sarnoff
Quadrangle Books
New York, N. Y. -- this is excellent

4. Teaching Materials for Loan: State Museum of Natural History
101 Halifax St.
P. O. Box 27647
Raleigh, N. C. 27611

Ask for general information sheet of services available.
" " teacher's information circular.

5. Magazines -- There are many that might be useful in Outdoor Recreation and Applied Ecology, but these are a must:

NATIONAL WILDLIFE Inquire to: Nation Wildlife Membership Services
1412 6th St. N.W.
Washington, D. C. 20036

AMERICAN FORESTS, Inquire to; American Forestry Association
1319 18th St. N.W.
Washington, D. C. 20036

WILDLIFE IN NORTH CAROLINA Inquire to: N. C. Wildlife Resources Commission
Raleigh, North Carolina

IDEAS AND NOTES

TEACHING MATERIALS:

The Ecological Crisis, 6 filmstrips, 3 cassettes, guides, SVE,
Society for Visual Education, Inc.
1345 Diversey Parkway
Chicago, Illinois 60614 - $50.00

MINERAL CONSERVATION TODAY, filmstrip with record and guide, SVE
CONSERVATION FOR TODAY'S AMERICA, filmstrip with record and guide, SVE

ECOLOGY AND AGRICULTURE, a multi-media kit, with five filmstrips, guides - $40.00
and cassette. From: Vocational Education Production
California State Polytechnic College
San Luis Obispo, California 93401

WATER POLLUTION, Filmstrip, tape, guide, from: VEP (above)
CAREERS IN NATURAL RESOURCES MGT., filmstrip, tape, guide, from: VEP

TOWN AND COUNTRY CATALOG OF REAL ESTATE FOR SALE - free on request
From: UNITED FARM AGENCY, INC.
(ask to be put on mailing list) 612 West 47th
Kansas City, Missouri 64112

The following information circulars are from N. C. WILDLIFE RESOURCES COMMISSION, Raleigh, N. C.

The Catfishes
Rainbow Trout in North Carolina
Facts About Fishes
Management of Eastern Cottontail Rabbit in North Carolina
Winter Birds in Your Backyard
Summer Birds in Your Backyard
N. C. Fishing Waters (Nantahala Lake)
Management of the Wild Turkey in North Carolina
Dear Sir: Please Send Me All About Wildlife
The European Wild Boar in North Carolina
Management of the Whitetailed Deer in North Carolina
Management of the Bob White Quail in North Carolina
Life History and Management of the Beaver in North Carolina
The Squirrel (Gray and Fox)
Bird Furniture
The Crappie in North Carolina

Hunting in North Carolina
The Bluegill in North Carolina
Management of the Ruffed Grouse in North Carolina

Some N. C. Freshwater Fishes (has color plates) - 25¢
State Museum Division
N. C. Dept. of Agriculture

Write: President's Environmental Merit Awards Program
Washington, D.C. 20460

IDEAS AND NOTES

Secure catalogs from: Haywood Technical Institute,
Clyde, N. C. 28721
(they have several programs related to Outdoor Recreation and Applied Ecology)

SOUTHEASTERN COMMUNITY COLLEGE,
Whiteville, N.C. 28472
(they have a new program in environmental technology)

MARTIN TECHNICAL INSTITUTE
Williamston, N.C. 27892
(they have fish and wildlife management,etc.)

Subscribe to: Southern Living, 821 N. 19th St. Birmingham, Alabama, 35202, to get addresses of recreation complexes. A wealth of information can be secured in this way for individual student projects. A student might be assigned to arrange for a week's stay somewhere telling everything anyone would want to know about the week's activities.

The texts used at Owen are:
1. Rural Recreation for Profit, Insterstate
2. OUR NATURAL RESOURCES, INTERSTATE
3. FOREST AND FORESTRY, INTERSTATE

There is a wealth of information in booklets, pamphlets, etc. from various agencies in Raleigh It will be well worth your time on your next trip to Raleigh to investigate. Go to the Forestry Division, Travel and Promotion, and Wildlife Division of Conservation and Development in Raleigh. It is the new white office building west of the Legislative Building.

AREA WILDLIFE BIOLOGISTS

Biologists:	Area Code	Phone Number	District
Mr. Dan M. Connelly 200 W. Church St. Edenton, N.C. 27932	919	482-4861	1
Mr. Sam F. Poole 507 Darby St. Kinston, N.C. 28501	919	527-0319	2

Biologists:	Area Code	Phone Number	District
Mr. Charles Woodhouse Holly Springs, N. C. 27540	919	552-4120	3
Mr. Dave Taylor Box 901 Albemarle, N.C. 28001	704	982-3685	6
Mr. Larry Warlick P. O. Box 871 Burlington, N.C. 27215	919	227-7568	5
Mr. Gene Russ General Delivery Elizabethtown, N.C. 28337	919	862-3831	4
Mr. Tom Monschein 128 Sloop St. Elkin, N.C. 28521	919	835-5427	7
Mr. John Collins Route 7, Box 627 Morganton, N.C. 28655	704	437-7082	8
Mr. A. E. Amons P. O. Box 417 Lake Junaluska, N.C. 28745	704	627-6474	9

LOCATION OF SOME OUTSTANDING NATURE TRAILS

IT'S YOUR MOVE.

LOCATION OF OUTSTANDING NATURE TRAILS

OUTDOOR RECREATION AND APPLIED ECOLOGY DEMONSTRATION CENTERS:

SCHOOL	LOCATION	CONTACT PERSON
Plymouth High School	Plymouth, N. C.	Neal Brown
North Lenoir High School	La Grange, N. C.	Roy Eubanks
Southern Nash High School	Bailey, N. C.	John Wells
East Montgomery High School	Biscoe, N. C.	Fred Bailey
Southern Alamance High School	Graham, N. C.	Alton Wilson
Crest High School	Shelby, N. C.	Carl DeBrew
East Surry High School	Pilot Mountain, N. C.	James Wilburn
Charles D. Owen High School	Swannanoa, N. C.	Bob Goodson
OTHER:		
Granite Falls Elementary	Granite Falls, N. C.	L. E. Cagle
Environmental Education Center	Salisbury, N. C.	Nancy Raynor
Northwest High School	Littleton, N. C.	Mac Edwards
Surry Central High School	Dobson, N. C.	Don Vestal
South Johnston High School	Benson, N. C.	Bob Hardie
Independence High School	Charlotte	Jerry Taylor

APPENDIX F

SUGGESTIONS and PROCEDURES for DEVELOPING TEACHING-LEARNING STATIONS

OUTDOOR RECREATION and APPLIED ECOLOGY I - 7060

OUTDOOR RECREATION and APPLIED ECOLOGY II 7061

DIVISION OF OCCUPATIONAL EDUCATION

AGRICULTURAL EDUCATION SECTION

DEPARTMENT OF PUBLIC INSTRUCTION

RALEIGH, NORTH CAROLINA

JULY 1972

REVISED: FEBRUARY 1973

REVISED: JULY 1974

INTRODUCTION

It is the consensus of opinion of everyone that had an input into the development of the "OUTDOOR RECREATION AND APPLIED ECOLOGY" curriculum: teachers, administrators, directors, consultants, and program coordinator, that the most effective means of student learning and involvement would be through the use of TEACHING-LEARNING STATIONS. The curriculum is intentionally devised to get most of the teaching-learning activities out of the classroom and into the out-of-doors. We are convinced that the best method to do this is through the development of TEACHING-LEARNING STATIONS, either on the school campus or nearby, so that learning experiences may be live and real. We believe that the best way to learn is still "Learning To Do By Doing", which has been the means used by vocational agriculture for more than 50 years.

It is also an objective of the "Outdoor Recreation and Applied Ecology" program to involve resource people (community, state, and federal) in the teaching-learning phase, therefore, this was taken into consideration in the planning of these TEACHING-LEARNING STATIONS.

With the above guidelines in mind, the twenty-one (21) teachers (16 vocational agriculture and 5 science), representing the eight Demonstration School Centers and the alternate Centers, were involved in a special inservice education institute held at Tom Brown FFA Camp at Barnardsville, N. C. 12-29 June 1972. Working in Groups and ecology, step-by-step procedures were devised for the development of the TEACHING-LEARNING STATIONS which are found in this publication. In order to standardize the stations the following format was used:

I. TITLE OF TEACHING-LEARNING STATION
II. DESCRIPTION OF THE STATION
III. RATIONALE
IV. REQUIREMENTS
    A. Land
    B. Equipment
    C. Facilities
    D. Time for Development
V. RESOURCES
VI. FFA AND SOE USES

We realize that these TEACHING-LEARNING STATIONS will vary with the geographical location of the school and also that other stations in addition to these we are suggesting may be developed. It is highly recommeded that students be involved in the selection of STATIONS, the setting priority in developing them, and that they be involved in the actual process of STATION development or construction. It is further suggested that other occupational program areas; ie, carpentry, construction, bricklaying, etc. be involved in STATION construction giving them live project experience.

Coordination and cooperation with other instructional programs (science, math, social studies, language arts, etc.) in the use of these STATIONS is highly recommended. Instructional media persons should also be involved and may offer teacher another excellent program resource. Student enrichment experiences should result from team teaching efforts. The TEACHING-LEARNING STATIONS should also be available for use of Elementary Middle School and Junior High School students and the vocational agriculture teacher should help in-service these teachers so they can effectively use the STATIONS when they are not being used by the high school programs. "Outdoor Recreation and Applied Ecology" students may be effectively trained and used as Assistant Instructors and Guides when other groups of students are using the STATIONS.

Some of the broad purposes of the TEACHING-LEARNING STATIONS are:

1. To create outdoor and environmental awareness.
2. To create outdoor recreation and environmental sensitivity.
3. To provide occupational exploration.
4. To provide occupational training.

Special emphasis should also be given to the four FFA Proficiency Awards pertaining to the general area of outdoor recreation and ecology:

1. Outdoor Recreation
2. Soil, Water and Air Management
3. Wildlife Management
4. FFA Chapter Safety

It is hoped that through the development and use of these TEACHING-LEARNING STATIONS, students may be sensatized with the need for and the challenge of employment opportunities in the areas of outdoor recreation and ecology.

The first revision of this publication was made in February 1973 and the second during a Teacher Inservice Workshop held on the campus at North Carolina State University during July 1974. Teachers participating and helping with this revision were:

Bob Goodson, Carl DeBrew, James Wilburn, Alton Wilson, John Wells, Donald Vestal, Decatur Jones, Roy Eubanks, Neal Brown, J. W. Busick, Fred Bailey, and Steve Matthis.

All Teaching-Learning Stations were revised and six new stations added for a total of twenty-nine now covered in this publication.

It is hoped that these materials will be of assistance in helping teachers plan and develop these Stations.

C. V. Tart, Chief Consultant Agri. Education

Travis E. Hendren, Consultant Occ. Programs

M. O. Phillips, Curriculum Consultant

Division of Occupational Education
State Department of Public Instruction
Raleigh, N. C. 27611

TEACHING-LEARNING STATIONS
IN
OUTDOOR RECREATION AND APPLIED ECOLOGY

By: Dr. Douglas Bryant

There is nothing new in the concept that youth and adults can learn in the out-of-doors. The history of public education in America is rich with attempts to provide real and meaningful outdoor learning situations for students and teachers. One author states that the outdoor curriculum is as significant a step as Horace Mann's free public school movement.[1]

Previous attempts reported in the literature to develop the outdoor theme to learning in school has unfortunately excluded mention of vocational teachers. Thus in the past, claims have been made that students learn best when their environment is a concern in the learning process. That is, students learn subject matter in biological sciences, English, Mathematics, etc. best when elements of the environment besides the four walls of the classroom are introduced into the learning process. Administrators who give leadership to such a concern and teachers who really broaden students' learning environments into the out-of-doors become concerned with more than the three-R's. They introduced other R's, such as; Responsibility, Realibility, Resourcefulness, Recreation, Reality, and Ruggedness. As one author explained, "functional outdoor undertakings call for and justify continuous emphasis in English, mathematics, science, health, safety, physical training, creative arts, recreation and social science."[2]

To the above, the program in outdoor recreation and applied ecology in eight demonstration schools in North Carolina adds the emphasis of occupational education. Talk today of the five day week adds greatly to the concept of leisure time and with this development enters a growth in employment opportunities. This is what is new in the North Carolina version of an outdoor curriculum - an emphasis upon career opportunities.

The development of the program where a vocational educator is a key participant will expose students to resource people who are not only keenly aware of the subject matter of their field - but are also very much aware of what people do in the jobs they hold in today's society, To illustrate further it may be said that a nature trail is important because of the plant growth elements it possesses, but it is even more important to learners when they can consider that many people perform a life's work (with pay) in activities relating to what can be observed and experienced in the trail. There are scientists, writers, lecturers, engineers, technicians, teachers, and many other occupations related to what the eye can see in a nature trail or land laboratory.

---

[1] Vinehall, William Gould, The Outdoor Schoolroom For Outdoor Living, Boston University, 1952, P. 3.

[2] Op. Cit.

Teaching-Learning Stations

The following teaching-learning stations were developed during a three week institute at Tom Brown FFA Camp in Barnardsville, N. C. The resource persons who brought various aspects of such a program to the group, each contributed to the development of the learning stations. It was recognized from the beginning that each school setting as a demonstration center would be different and would develop its program around the facilities available. The following general guidelines were developed at the institute:

1. An advisory committee consisting of membership of school and community leaders should be organized early in the development of the program.
2. A plan for utilizing the school lands most effectively should be developed in cooperation with all who are to use the facility as a learning resource.
3. Appropriate resource people should assist in the development of teaching-learning stations.
4. The vocational agriculture teacher teaching the course "Outdoor Recreation and Applied Ecology" and his students assume responsibility for coordinating and developing teaching-learning stations.
5. The course is Outdoor Recreation and Applied Ecology should encourage FFA and Supervised Occupational Experiences for the students enrolled in the course. A few examples of such involvement are:
    a) FFA
        1. Participation in FFA Contests beyond the local chapter level including face-to-face contests.
        2. Development of local awards programs not covered by State programs-of-work.
        3. Utilizing students as guides for other students when resources are used.

4. Involve students as assistant instructors at Teaching-Learning Stations.

b) Supervised Occupational Experience

Ample opportunity is envisioned for students to gain exploratory and/or actual work experience in areas related to study either on the school project itself or in community resources available in the community.

Some examples are:

- a riding stable
- a camp ground (private, state, etc.)
- a sporting goods store
- a golf course
- a swimming pool
- a fishing resort establishment
- a hunting lodge
- with workers in agencies (ie., Game Protectors, Soil Conservation Service, Forest Ranger, etc.)
- boat marina

In addition to this type of involvement in Supervised Occupational Experience, we believe that some students and their parents may choose to alter their land resources to a recreational purpose. For example, a low return farm in a fast growing recreation area may well be changed into a campsite, a golf course, fishing ponds, etc. for an increased income. The high school instructional program as well as adult education efforts should encourage this development within the community.

ACKNOWLEDGEMENTS

The Director and Coordinator of the OUTDOOR RECREATION AND APPLIED ECOLOGY Institute express their appreciation to the teachers, resource persons, Tom Brown, FFA Camp personnel, and all others who contributed to the success of the institute as well as the development of TEACHING-LEARNING STATIONS materials which are found in this publication.

First the Resource People who provided consultant expertise, demonstrations, and materials for STATION planning: Luther Partin (Wildlife Commission), Mitchell Clary (Soil Conservationist), Bryan Taylor (State Parks), John Collins (Game Biologist-Wildlife Commission), M. O. Phillips (Consultant, State Department), Eugene Upchurch (State Museum), Ed.Jenkins (Water Safety-Wildlife Commission), Bill Bonner (Fish Biologist-Wildlife Commission), Jim Coffin (Haywood Technical Institute), Lyle Morgan (Hunter Safety-Wildlife Commission), Ranger McLean (Pisgah National Park), Ted Mew (Water & Air Resources), Charles Keels (Tom Brown Camp Director) and Dr. Larry Leggett (Environmental Education Center, Oteen, N.C.). Also Alan Lenk (Environmental Education Center, Oteen, N. C.) Nature Trail

Special thanks to the following teachers of vocational agriculture and science who actually developed the guidelines and procedures for the TEACHING-LEARNING STATIONS:

Felix L. Stevens (Wilkes Central) P. O. Box 744, North Wilkesboro, N. C.
James F. Bailey (E. Montgomery) Rt. 1, Biscoe, N. C.
J. W. Busick (W. Alamance) Rt. 1, Gibsonville, N. C.
Brooks E. Piercy (Crest) Box 751, Boiling Springs, N. C.
John H. Wells (Southern Nash) Box 217, Bailey, N. C.
William S. Lucas (Northwood) Box 761, Pittsboro, N. C.
Carlton T. Forehand (Plymouth) 306 Winesett Circle, Plymouth, N. C.
Edison L. Towe, Jr. (Plymouth) 107 Thomas Street, Plymouth, N. C.
Clayton S. Ragan (Deep River) Rt. 5, Sanford, N. C.
R. B. Goodson (Charles F. Owen) Rt. 1, Box 190, Black Mountain, N. C.
Edward S. Howard, Jr. (N. Lenoir) Rt. 1, Deep Run, N. C.
Elwin G. Key (E. Surry) Rt. 1, Box 190, Ararat, N. C.
James M. Wilburn (E. Surry) P. O. Box 56, Pilot Mountain, N. C.
Mack S. Edwards (Northwest) Rt. 1, Box 191, Roanoke Rapids, N. C.
Alton W. Wilson (Southern Alamance) Rt. 2, Graham, N. C.
Roy A. Eubanks (N. Lenoir) Rt. 2, Box 269-A, Snow Hill, N. C.
Ronald B. Alexander (Crest) Rt. 3, Box 922, Shelby, N. C.
Ronald D. Atkins (E. Montgomery) Rt. 1, Jackson Springs, N. C.
William "Bo" Cash (Cleveland Co.) Rt. 3, Box 950, Shelby, N. C.
Edward N. Brown (Plymouth) 210 West Third Street, Plymouth, N. C.
J. Carl DeBrew (Crest) Rt. 8, Box 366-B, Shelby, N. C.

Also helping with July 1974 Revision:

Don Vestal (Surry Central) Rt. 1, Box 336, Boonville, N. C.
Decatur Jones (Bowman) Box 276, Mt. Gilead, N. C.
Steve Matthis (NCSU Grad Student)

Finally to Sharon Jones our thanks for typing and editing this publication.

Dr. C. Douglas Bryant, Institute Director

Travis E. Hendren, Consultant
Occupational Programs
State Department of Public Instruction
Raleigh, N. C. 27611

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STATION NO 1

I. NATURE TRAIL:

II. DESCRIPTION: A trail or series of trails consisting of a network of selected teaching stations encompassing a variety of types of terrain found on the school campus or on adjoining lands.

III. RATIONALE:

A. To provide various groups the opportunity to develop an awareness of the ecological relationships which exist between living things.

B. To provide students the opportunity for supervised work experiences in order to develop skills and create an awareness of occupational opportunities.

C. To provide students and other interested individuals and/or groups the opportunity to experience nature through direct contact with the environment.

D. To develop sensitivity and appreciation.

E. To provide training stations for various FFA contests and activities.

IV. REQUIREMENTS:

A. Land - make the best use of available land with appropriate local advice.

B. Equipment:

1. Power chain saw
2. The necessary hand tools to construct and maintain the various teaching stations.
3. Label maker - (metal tape)
4. Appropriate lumber for signs, bridges, and other needed facilities.
5. Battery operated megaphone.
6. First aid kit.
7. Abney level.
8. Increment borer.
9. Biltmore sticks.
10. 100 ft tape.
11. Other specialty equipment for specific teaching stations if need is indicated.
12. Lawn mower and/or "clear-away" or "weed-getter".
13. 35 mm SLR camera and lens assortment.
14. 7 X 35 fieldglasses.
15. Router with templates and bits.

C. Facilities:

1. Pond and/or stream.
2. Varied topography.

Station No. 1 (continued)

3. Various timber stands.
4. Outdoor classroom
5. Weather station.
6. Soil erosion plot.
7. Geology wall.
8. Poisonous plant display.
9. Wildlife habitat plots.
10. Wildlife feed stations.
11. Wildlife housing.
12. Soil profile
13. Labeling and identification of flora and fauna.
14. (Observation platform).
15. Others to be added or suggested.

D. Time for Development: Three years with continuous updating.

V. RESOURCES:

1. The Nature Program at Camp by Janet Nickelsburg, 1960, Burgess Publishing Co., 426 South 6th Street, Minneapolis 15, Minnesota.

2. Nature Recreation by William Gould Vinal, 1963, Dover Publications, Inc., New York, New York.

3. List of Various Kinds of Trails from North Carolina Museum of Natural History.

4. Career Opportunities/Ecology, Conservation, and Environmental Control, 1969, J. G. Ferguson Publishing Company, Chicago, Illinois.

5. A Handbook for Environmental Education - Nature Study for Conservation, 1971, John W. Brainerd, The MacMillan Company, New York, New York.

6. Eugene Upchurch, N. C. Museum of Natural History, Raleigh, N. C.

7. Local Soil Conservation Service Personnel.

8. Trail Planning and Layout by Bryon L. Ashbaugh, National Audubon Society, Nature Centers Division, 1130, Fifth Avenue, New York, New York 10028.
9. Developing On Site Nature Trails, Alan Lenk, Environmental Educ. Center Oteen, N. C.

*See: "Suggestions and Procedures in Developing Nature Trails"

Outdoor Recreation and Applied Ecology - 7060 and 7061

10. Nature Trails, Extension Bulletin No. 368, Agricultural Extension Ser. University of Minnesota, St. Paul, Minnesota 55101

STATION NO. 2

I. **SOIL PROFILE:**

II. **DESCRIPTION:** A protected cut away section of the earth's crust displaying the various soil layers.

III. **RATIONALE:**

A. To develop an appreciation and awareness of the process of soil formation.

B. To use as a teaching aid in the FFA Land Judging Contest and for use by science classes.

C. To develop an appreciation and an awareness for occupations which conserve our existing soil resources.

D. To stimulate interest in the FFA Soil, Water, and Air Management Proficiency Contest.

IV. **REQUIREMENTS:**

A. Land - An accessible site where the soil profile may be excavated and maintained with aminimum of effort and soil loss.

B. Equipment:

1. The necessary power and hand equipment necessary to excavate and maintain the profile.

2. The necessary tools and lumber to construct a shelter and enclosure to protect the site.

C. Facilities: Shelter and enclosure to protect the soil profile.

D. Time for Development: One year with continued maintenance.

V. **RESOURCES:**

1. Local soil conservation district supervisor and personnel.

2. Land Judging in North Carolina, North Carolina Extension Service, Raleigh, N. C.

3. Soil survey maps and aerial photographs (may acquire from local SCS).

4. Conservation for Camp and Classroom, Robert O. Bale, 1962, Burgess Publishing Company, 426 South Sixth Street, Minneapolis 15, Minnesota.

5. Nasco Catalog.

STATION NO. 3

I. WEATHER STATION:

II. DESCRIPTION:

A. An open area free for overhead obstruction which might interfere with accuracy of instruments.

B. A series of appropriate instruments for measuring and recording weather conditions.

III. RATIONALE:

A. To enable students to learn the use of weather instruments and to develop an appreciation of the occupations which utilize these instruments.

B. To be able to detest changes in air conditions.

C. To keep records of local weather conditions as they affect weather forecasting and to enable students to better understand weather reports.

D. To create interest in the FFA soil, water, and air management proficiency contest.

IV. REQUIREMENTS:

A. Land - A suitable unobstructed area.

B. Equipment:

1. Rain gauge.
2. Wind speed and direction equipment.
3. Recording Barometer and charts.
4. Psycrometer.
5. Recording thermometer and charts.

C. Facilities:

1. Housing for instruments.
2. Source of power for recording devices.
3. Fenced or enclosed area.
4. Filing facilities for records.

D. Time for Development: One year with continuous updating and record keeping.

V. RESOURCES:

Station No. 3 (continued)

1. Health Department officials.
2. Local weather reporting and recording stations.
3. U. S. Weather Bureau.
4. Local Newspaper.
5. NASCO Catalog.
6. U. S. Environmental Protection Agency, Washington, D. C. 20460.
7. U.S.D.A. Catalog of weather publications # ____________.
8. Book - Weather - Western Publishing Co., Racine, Wisconsin.
9. Weather, Price List 48, Stock #9000-4857
   Supt. of Documents, Gov't. Printing Office
   Washington, D. C. 20402

STATION NO. 4

I. AIR POLLUTION DETECTION STATION:

II. DESCRIPTION:

A. An area free from overhead obstructions which might interfere with accuracy of instruments.

B. A series of appropriate instruments for measuring air quality.

III. RATIONALE:

A. To enable students to learn the use of air pollution detection instruments and to develop an appreciation for the occupations which use these instruments.

B. To enable students to determine the source of incoming air pollutants.

C. To create interest in the FFA soil, water, and air management proficiency contests.

IV. REQUIREMENTS:

A. A suitable unobstructed area.

B. Equipment.

1. Directional dustfall sampler complete with slideholder and slides (APW - 1), Forestry Suppliers Inc., 205 W. Rankin St. Jackson, Mississippi 39204.
2. Extra set of slides for dustfall sampler.
3. Slide positioner for dustfall sampler.
4. Microscope with bulb illuminator.
5. Air pollution detection kit Model # AM-61, source: Educational Products Div., LaMotte Chemical Products Co., Chestertown, Md. 21620.
6. Electric Vacuum Pump for above kit (AM-61).

C. FACILITIES:

1. Fenced or secured area.
2. Source of power for vacuum pump.
3. Pole mount for dust fall sampler.

D. Time for Development: 1 year with continuous updating.

V. RESOURCES:

1. Health Department Officials.

2. Local Air Quality Personnell.

Station No. 4 (continued)

3. U. S. Weather Bureau.
4. Local Newspaper.
5. LaMotte Chemical Products Catalog.
6. U. S. Environmental Protection Agency, Washington, D. C. 20460.
7. VEP Air of the Agricultural Environment Slidefilm.
8. Effect of Air Pollution on Plants USDA Slide Set.

STATION NO. 5

I. NOISE POLLUTION DETECTION STATION:

II. DESCRIPTION:

A. Availability and access to various sources and levels of noise.

B. Appropriate instruments for detecting and measuring various sources and levels of noise.

III. RATIONALE:

A. To create an awareness of the effects of noise.

B. To enable students to learn the use of noise pollution detection instruments and to develop an appreciation of the occupations which use these instruments.

C. To create students an awareness of safety standards related to noise.

IV. REQUIREMENTS:

A. Equipment:

1. Noise and sound level tester with case, source (Broadhead Garrett)
2. Source of various levels of noise.

B. Time for Development: 1 year or less.

V. RESOURCES:

1. Noise Pollution, stock # 5500-0072, E.P.A., Office of Noise and Control, Washington, D. C. 20460.

2. Noise, The Environmental Problem, A guide OSHA Standards, EPA Source same as above.

STATION NO. 6

I. **WATER POLLUTION DETECTION STATION:**

II. DESCRIPTION: Water sources suspected of being polluted and a water pollution detection kit that can be carried to the source.

III. RATIONALE: This unit is designed to provide individuals with the opportunity to recognize water pollution and to use water pollution detection instruments so that the source of contamination might be identified.

IV. EQUIPMENT:

A. LaMott Water Pollution Detection Kit, Model AM-22.

V. RESOURCES:

1. LaMott Water Pollution Detection Kit, Model AM-22.
2. Ecology Polluted Water (Slide Set) Nasco, Fort Atkinson, Wisconsin 53538

STATION NO. 7

I. **PICNIC AREA:**

II. **DESCRIPTION:** A land area with suitable terrain, shade, picnic tables, grills, and garbage containers to accommodate picnicking.

III. **RATIONALE:**

A. To provide students opportunities to develop skills necessary in planning and constructing facilities and equipment for a picnic area.

B. To help students become aware of occupations involving picnic area planning, developing, and maintenance.

C. To enable students to develop skills necessary for planning group activities envolving picnic facilities.

D. To use as an FFA community service project and as a facility for FFA and other school cookouts.

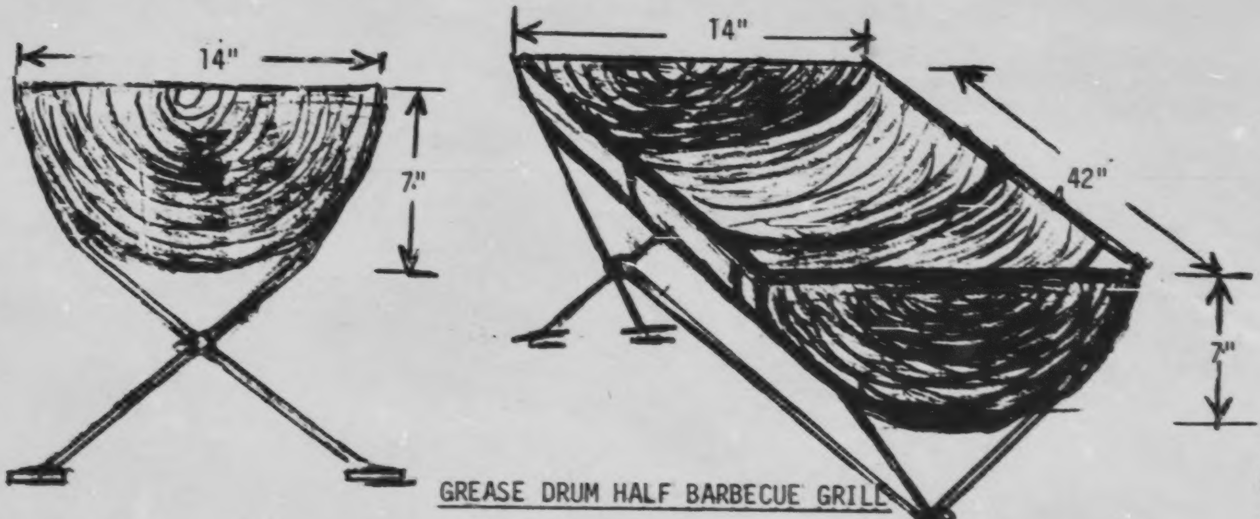
IV. **REQUIREMENTS:**

A. **Land** - a well-drained shaded area large enough to accommodate the number of tables, containers, and grills plus a parking area of approximately 5,000 sq. feet.

B. **Equipment** - bricks, lumber, grill, fastening devices, concrete, mortar, paint, paint brushes, preservatives, hand tools and power tools for carpentry and masonry, chain saw, shovels, hole diggers, sling blade, and lawn mower.

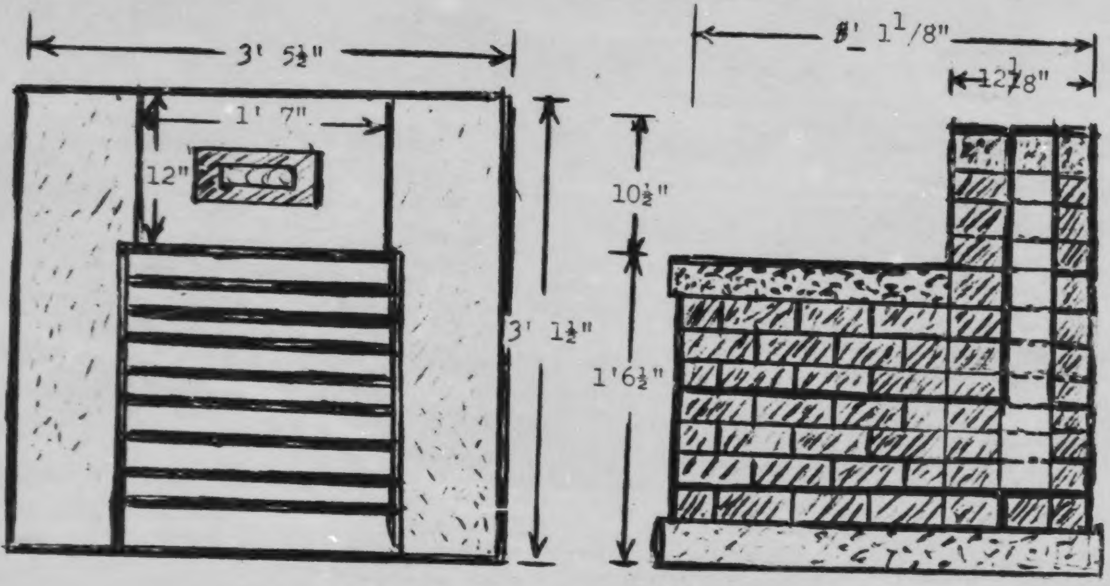
C. **Facilities** - picnic tables, grills, garbage cans, benches, and water and electricity if convenient.

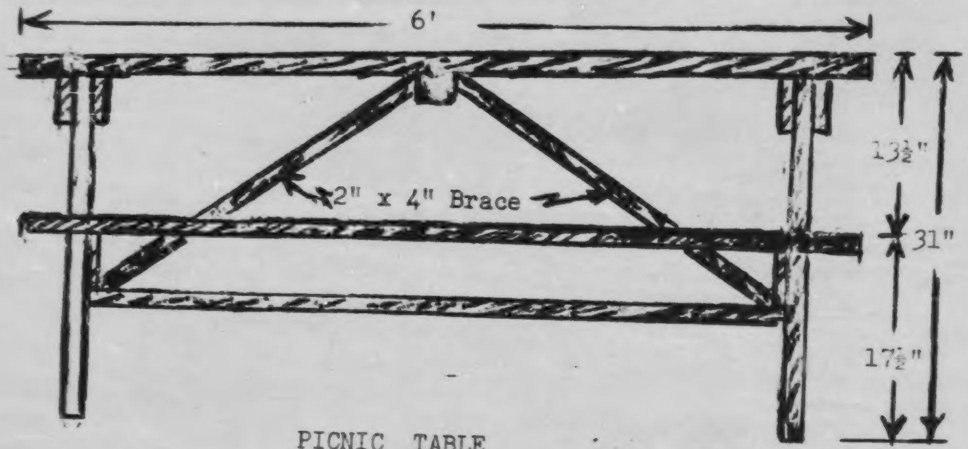
D. **Time for development** - one year with continued maintenance.



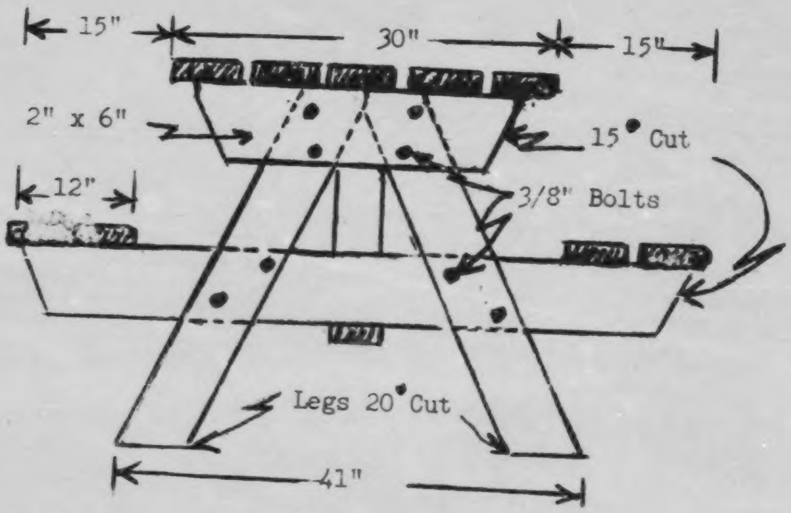
GREASE DRUM HALF BARBECUE GRILL

OUTDOOR FIREPLACE


3' 5½"
1' 7"
12"
3' 1½"
8' 1 1/8"
12 1/8"
10½"
1'6½"

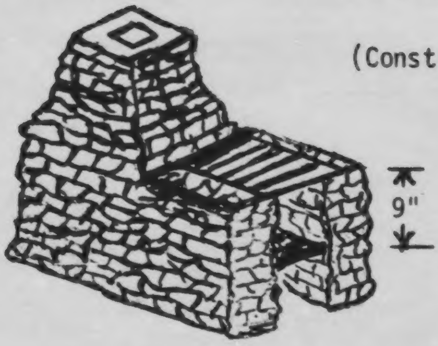

6'
2" x 4" Brace
13½"
31"
17½"

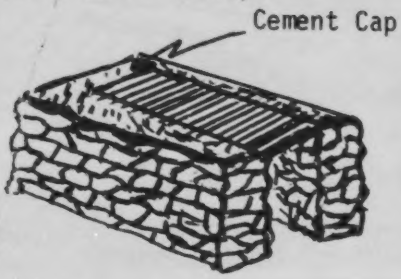
PICNIC TABLE


15"
30"
15"
2" x 6"
15° Cut
12"
3/8" Bolts
Legs 20° Cut
41"

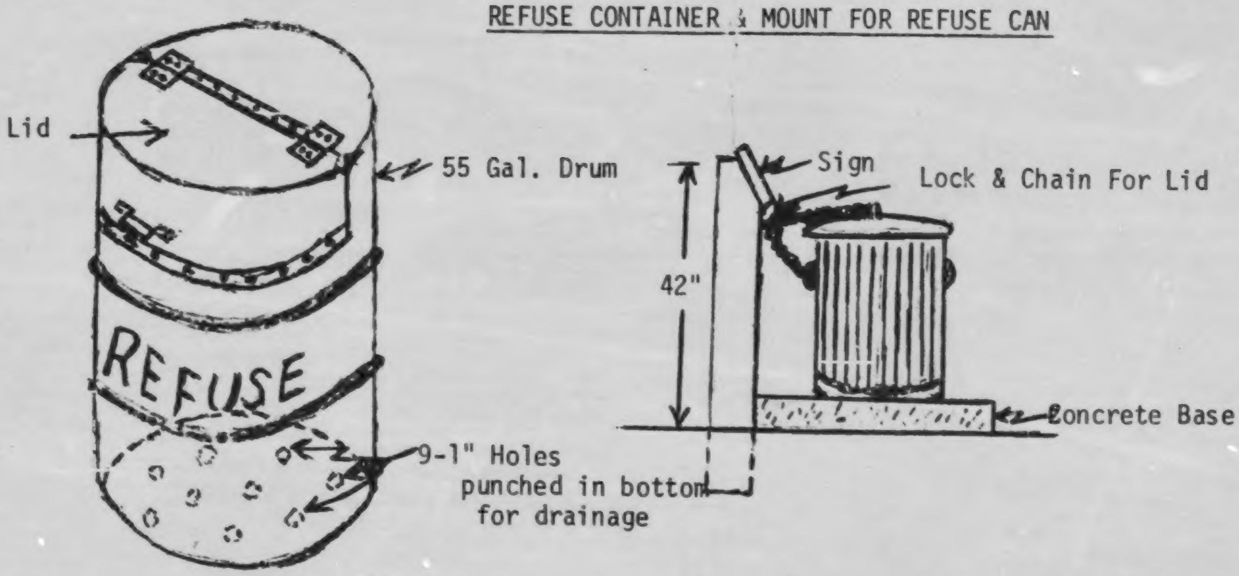
TWO TYPES OUTDOOR FIREPLACES

(Constructed From Native Field Stone)





REFUSE CONTAINER & MOUNT FOR REFUSE CAN


Lid
55 Gal. Drum
REFUSE
9-1" Holes punched in bottom for drainage
Sign
Lock & Chain For Lid
42"
Concrete Base

V. RESOURCES:

1. The Forestry Handbook. USDA.
2. Rural Recreation for Profit, Smith, Partain, and Champlin, 1966, The Interstate Printers and Publishers, Inc., Danville, Illinois.

STATION NO. 8

I. WILD GAME TRAPS DISPLAY:

II. DESCRIPTION: Display of four major types of traps and related information such as laws, history, and economic value.

III. RATIONALE: This learning station will be designed to acquaint student with old and new traps and their use. Students will be cautioned as to N. C. trapping regulations and should be informed as to possible economic opportunity.

IV. REQUIREMENTS:

A. Land - this could possibly be placed outdoors and sufficient land is needed.

B. Equipment:

1. Victor type traps (Jaws)
2. Conibear
3. Hav-A-Hart
4. Home Made

C. Display and storage space needed to house traps.

D. Time: one year

V. RESOURCES:

1. Fur, Fish, and Game Magazine.

2. Field and Stream Magazine.

3. N. C. Game Laws.

4. Herter's Catalog.

5. N. C. Wildlife Magazine.

6. Local Wildlife Protector.

7. Local Fur Market.

STATION NO. 9

I. ARCHERY RANGE:

II. DESCRIPTION:

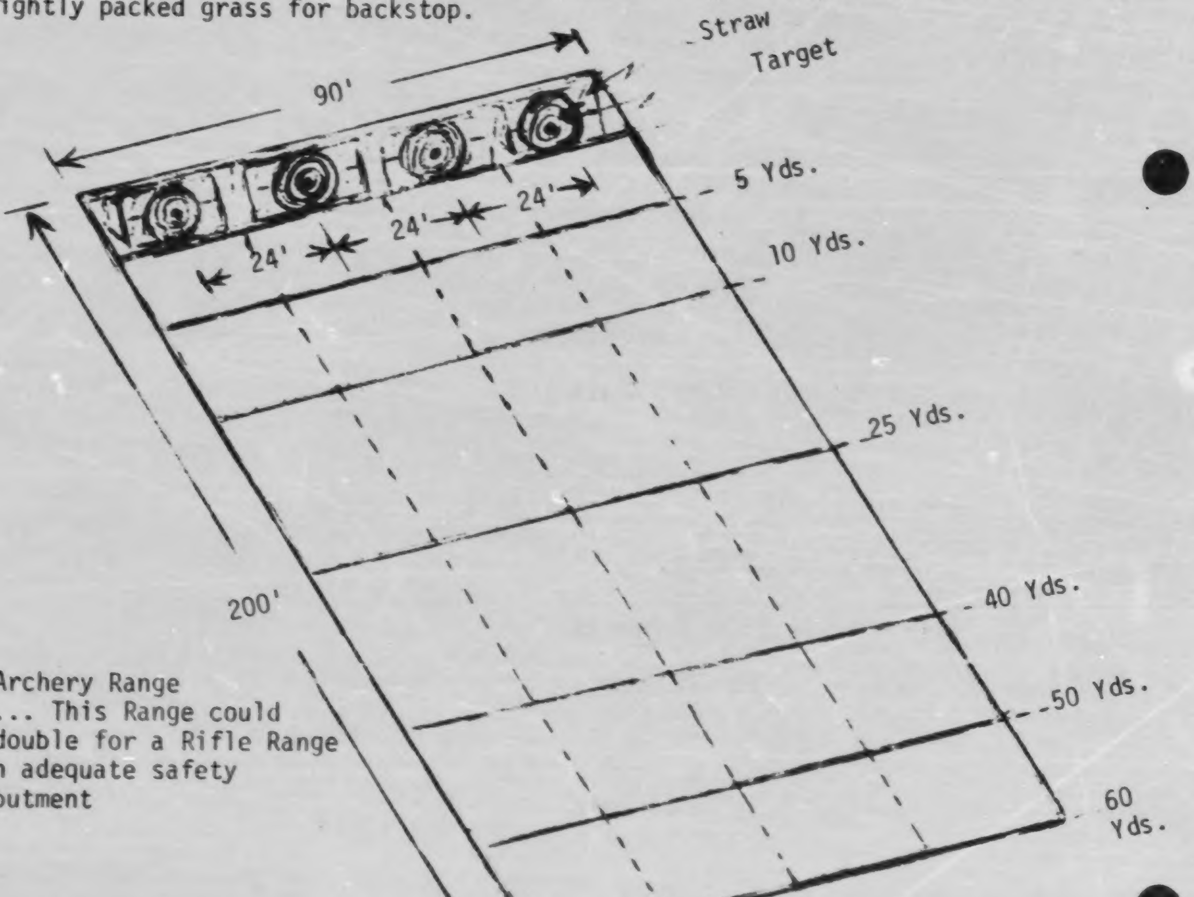
A plot of land approximately 30 yards and 100 yards will accommodate four archers to practice at one time. Target butts should be about 8 yards apart from left to right. Shooting at the targets will begin at 5 yards and advance up to 60 yards as the individual develops his skill.

III. RATIONALE:

This unit is designed to introduce the individual to the field of archery. The individual will be given the opportunity to identify and use the pieces of equipment in a correct and safe manner. (Individuals should recognize the potential of the weapon he is learning to use.)

IV. REQUIREMENTS:

A 30 yard by 100 yard area with limited access, right and left hand bows testing 30#, 45#, target arrows with lengths of 26" and 28", arm guards, shooting tabs or gloves for right and left hand shooters; target faces, target butts and stands, combination bow rest and ground quiver, bales of tightly packed grass for backstop.



A Simple Archery Range Layout ... This Range could also double for a Rifle Range with adequate safety abutment

STATION NO. 9 (continued)

V. **RESOURCES:**

A. The Archer's Bible - price $2.50 - Doubleday and Co., Inc., Gordon City, N.Y.

B. ABC's of Archers - 25¢ - Shakespeare Co., Kalamozoo, Mich. 49001.

Additional information may be obtained from:

C. Bear Archery Co. - Rt. 1, Grayling, Mich. 49738.

D. Browning Arms Co. - Archery Div., - 1706 Washington Avenue, St. Louis, Missouri 63100.

E. Hoyt Archery Co., 11510 Natural Bridge, Bridgeton, Missouri 63121.

F. Ben Pearson, Inc., Pine Bluff, Arkansas 71601.

STATION NO. 10

I. HORTICULTURE DISPLAY AREA:

II. RATIONALE:

A. To show students many of the various horticulture plants used for home and commercial plantings.

B. To teach identification for forestry, horticulture, and biology students.

C. To teach cultural practices in growing and maintaining plants.

III. DESCRIPTION: This may be a plot of an acre or more - or it may consist of a group or series of several plots of irregular shapes and size which are not suited for other school purposes.

IV. REQUIREMENTS:

A. Plot or plots of land.

B. Equipment.

1. Tiller (power).
2. Sprayer - 2 - 3 gallons.
3. Assorted hand tools - shovels, rakes, etc.
4. Lawn mower.
5. Garden tractor (optional).
6. Irrigation - water supply.
7. Supply of assorted plants.
8. Lime and Fertilizer.

V. RESOURCES:

A. Local Nurseries.

B. Local Seed and Fertilizer Dealer.

C. Reference books used in Horticulture Course.

D. Bulletins from Extension Agent.

E. Local Horticulture Teacher.

VI. FFA & SOE:

A. Proficiency Awards.

B. Team Horticulture Contests.

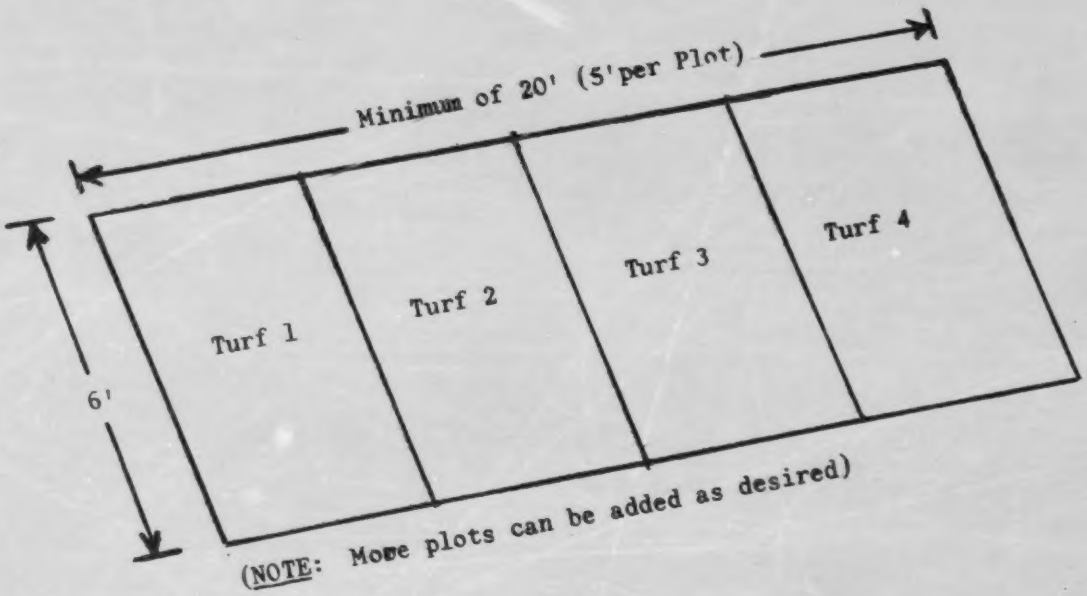
C. Exploratory work experiences.

1. Visit greenhouses - commercial.
2. Visit Florist class.
3. School work experience on plot.

STATION NO. 11

I. TURF GRASS PLOTS:

II. DESCRIPTION: Several plots of different kinds of turf grasses with at least 30 square feet per plot. Plots should have dividers to keep grasses from crossing into other plots.


Minimum of 20' (5'per Plot)
6'
Turf 1
Turf 2
Turf 3
Turf 4
(NOTE: More plots can be added as desired)

III. RATIONALE:

A. To help students identify turf grasses used on lawns, parks and playing fields.

B. To demonstrate maintenance of different turf grasses.

C. To show characteristics of different turf grasses.

IV. REQUIREMENTS:

A. At least 100 square feet of land suitable for turf grasses.

B. Desired types of seeds or sprigs.

C. Fertilizer.

D. Fungicides.

Station No. 11 -(continued)

E. Herbicides

F. Metal, brick or wood dividers for plots.

G. Spray equipment.

H. Fertilization equipment.

I. Grass cutting equipment.

J. Soil testing equipment.

V. FFA AND SOE:

A. Plots could be used in FFA Ornamental Horticulture Contest.

B. Student could maintain plots after school or in summer for SOE.

VI. RESOURCES:

A. Turf Maintenance; The Pennslyvania State University, College of Agriculture, Agricultural Experiment Station, University Park, Penn.

B. Turfgrass, Maintenance and Establishment, A Teacher's Manual. The Pennsylvania State University, College of Agriculture, Agricultural Experiment Station, University Park, Penn.

C. Yearly Catalog, Porter Bros., Shelby, N. C.

D. Turf Management Handbook, Howard B. Sprague, The Penn. State University, University Park, Penn.

E. Local Golf Courses.

STATION NO. 12

I. CONSTRUCTING A FISH POND:

II. DESCRIPTION: This will be a warm water fish pond 1/4 to 1 acre in size, 3 to 10 feed deep, 12' or more bank, trees and shrubs cleared away from immediate bank area to eliminate leaf problem. No cattle or other livestock allowed to use pond for reasons of disease and damage. Should have 3:1 slope.

III. RATIONALE: The purpose will be to offer K-14 education through the environment concerning recreational and biological aspects of warm water ponds.

IV. REQUIREMENTS:

A. Size depends upon locale and land available, recommended stocking 50 bass - 500 bluegill per acre.

B. Check with local governmental agencies on regulations.

C. Equipment:

1. Canoes, boats.
2. Mower.
3. Water test kit.
4. Plankton net.
5. Thermometers.
6. Fishing equipment.
7. "Safety cable".
8. Lifesaving devices.
9. Sample bottles.
10. Microscopes.

D. Facilities: Information and equipment storage booth, pier.

E. Time involved for fish maturity, etc. would be three years.

V RESOURCES:

1. USDA Farmer's Bulletin #2250.

2. Our Natural Resources - Interstate Printers.

3. Pond Life, R. Ford.

4. Circular 445 - N. C. State Ag. Extension Service.

5. Techniques of Fish Pond Management, USDA Bulletin #2210.

6. Soil Conservation Service.

7. Local Health Department.

* Drain pipe, spillway.

STATION NO. 13

I. FISHING EQUIPMENT DISPLAY:

II. DESCRIPTION:

This is a teaching station designed to familiarize student with fishing equipment and use. A storage - display cabinet is desirable to store and exhibit the fishing equipment.

III. RATIONALE:

A. This unit is designed to familiarize the student with the identification, selection and use of some of the more common kinds of fishing equipment.

B. This knowledge plus skills in equipment use could prepare student for employment in this field.

IV. REQUIREMENTS:

A. Equipment: (2 each)

1. Cane pole
2. Bait casting outfits
3. Spin casting outlets
4. Spinning outfits
5. Fly casting outfits
6. Assorted lines, lures, floats, books, and sinkers.
7. Display-storage cabinet.

B. Pond or stream access desirable:

C. Casting practice area and targets desirable:

V. RESOURCES:

1. Herter's Catalog

2. McClanes Standard Fishing Encyclopedia

STATION NO. 14

I. GAME IDENTIFICATION DISPLAY:

II. DESCRIPTION: Mounts, photographs, or drawings of game animals native to local area and/or North Carolina.

III. RATIONALE: To provide learning experiences in local game identification.

IV. REQUIREMENTS:

A. Observation areas on campus or nature trail.

B. Taxidermy equipment, photography equipment, pictures, mounts, drawings.

C. Display and storage space 14 feet x 14 feet.

D. Secure basic mounts and add others when available.

V. RESOURCES:

A. Our Wildlife Neighbors, Raleigh, N. C.

B. Wildlife in North Carolina, Raleigh, N. C.

C. Photographing Nature, D. Linton.

D. N. C. Museum of Natural History.

E. Rural Recreation for Profit, The Interstate Publishers and Printers, 1968.

F. Herter's Inc., Rural Route I, Waseca, Minnesota.

G. Herter's Professional Course in the Science of Modern Taxidermy, Herter's Inc., Waseca, Minn.

STATION NO. 15

I. **BOAT RAMP**:

II. **DESCRIPTION**: This ramp should be 5" thick, 10' wide, 30' long on a slope of 10-15° or adapted to local situation. Pier should be desired length.

III. **RATIONALE**: To teach a student to properly locate and construct a boat ramp and pier with safety aspects in mind. Student should learn proper launching and loading of boat. Include occupational opportunities as part of the instruction.

IV. **REQUIREMENTS**:

A. Sufficient shore for pier and ramp.

B. Necessary construction materials. (Creosoted posts and cypress lumber, throw rope in a cabinet, boats should be available.

C. Local Marina, Wildlife Access Ramps, or other boat ramps may be used as teaching-learning stations.

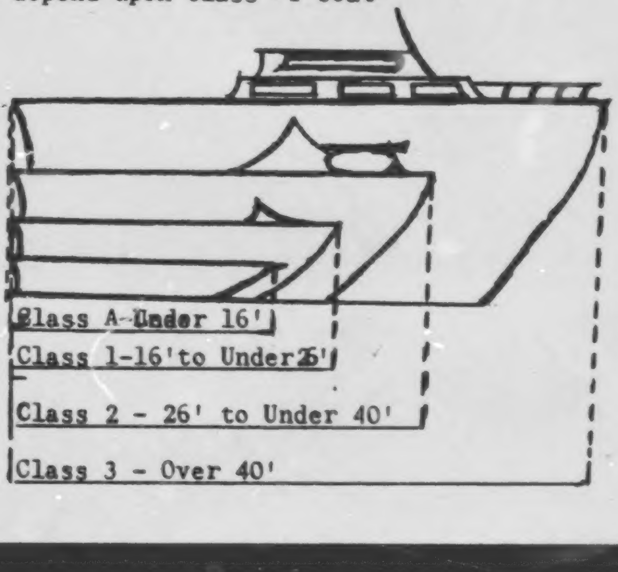
D. Check local rules and regulations or ordinances.

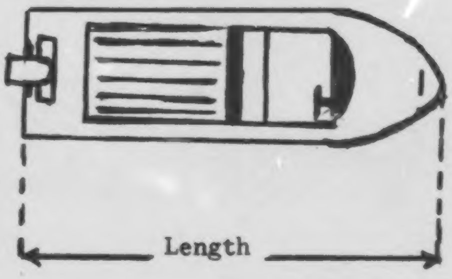
V. **RESOURCES**:

1. N. C. Wildlife Resources Commission, Box 2919, Raliegh, N. C.
2. N. C. Statutes on Game, Fish, and Boat Laws.
3. Outdoors U.S.A., 1967 Yearbook of Agriculture, U. S. Printing Office.
4. Manual for Outboard Motors, Outboard Marina Corp., Milwaukee, Wis.

CLASSES OF MOTORBOATS

Motorboats are divided into four classes according to length. The boat's class will determine what equipment must be carried aboard. Pier and ramp requirements will also depend upon class of boat





STATION NO. 16

I. PLANT AND INSECT DISPLAYS:

A. Concentrating on plant and insect identification and relationship.

B. Expansion to other areas important to agriculture and biology.

II. DESCRIPTION: Exhibition cases to be used in an outdoor classroom as portable materials or in an enclosed natural museum as permanent materials.

III. RATIONALE:

A. To identify various plants and insects.

B. To familiarize students with diseases common to the area's domestic and natural plants.

C. To familiarize students with relative causes of these diseases.

D. To demonstrate relationship of plants to animals - both beneficial and nonbeneficial.

E. To introduce plant and animal life cycles.

IV. REQUIREMENTS:

A. Student participation in collecting and mounting specimens.

B. Plant and insect mounting kits.

C. Portable or permanent display cases (perhaps mountings in large picture frames arranged as a book) arranged in proper groupings.

D. Outdoor or indoor display area.

V. RESOURCES:

A. County Extension Chairman.

B. 4-H Publication.

C. Field Guide to Insects.

D. U. S. Department of Agriculture Publication on Plant Diseases.

E. Bookstores.

VI. OCCUPATIONAL ASPECTS:

A. Forestry.

B. Crop Farming.

STATION NO. 17

I. GOLF GREEN:

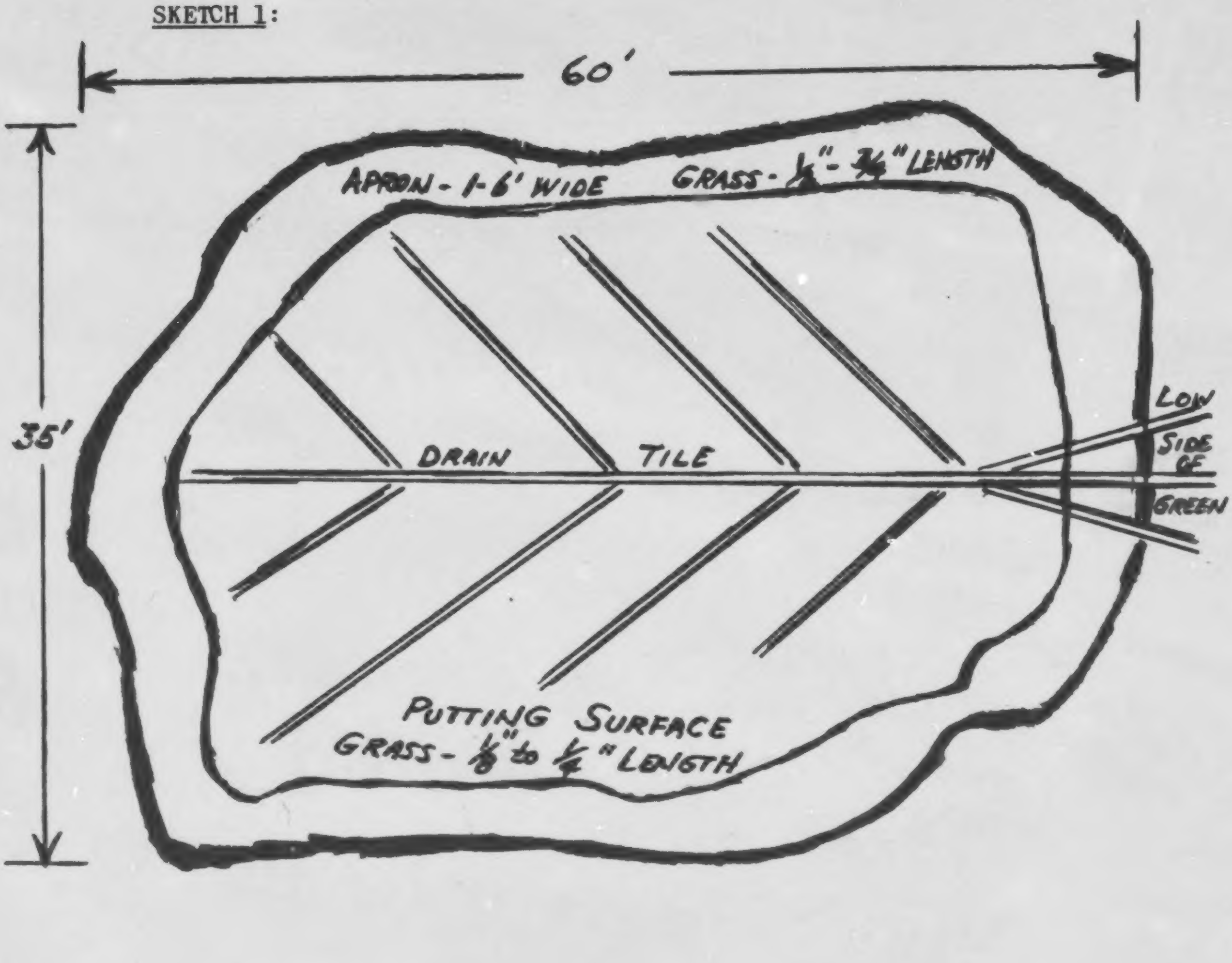
II. DESCRIPTION:

Ground on which the turf is intensively managed to provide a suitable playing surface for the practice of golf.

A. Location - any well drained site away from automobile and pedestrian traffic.

B. Size - golf greens are subject to wide variations in size and shape. The actual putting surface is ideally surrounded by a fringe or apron which is managed as if it were part of the green except that the grass is maintained at greater length. The green is Sketch 1 is approximately 2000 square feet in size which should prove adequate in most situations.

SKETCH 1:

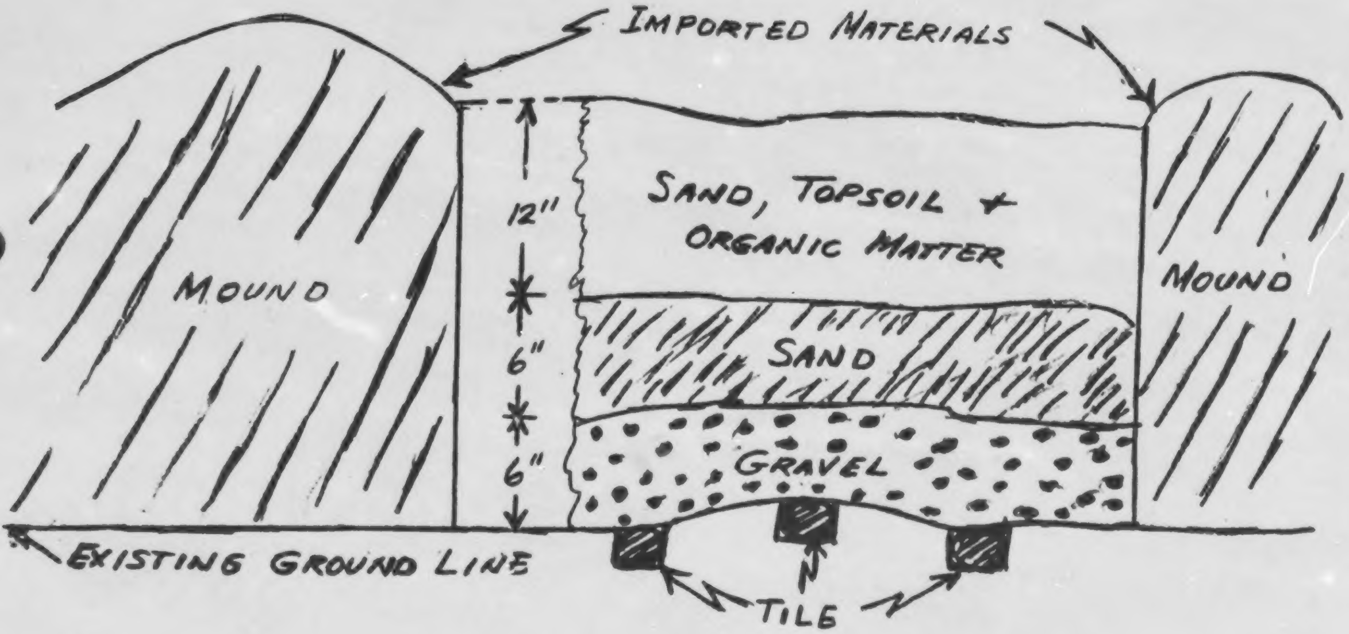

60'
35'
APRON - 1-6' WIDE
GRASS - 1/2" - 3/4" LENGTH
DRAIN
TILE
LOW SIDE OF GREEN
PUTTING SURFACE
GRASS - 1/8" to 1/4" LENGTH

Station No. 17 (continued)

C. Contour - gently rolling (presents golfer with a variety of shots since the ball does not always roll straight.) If space permits the golfer to practice approach shots, the green should be flanked by two or more low mounds which permit practice from a variety of lies and stances. Such mounds also give the green more perspective when approached from a distance.

D. Profile - to insure proper drainage a green should consist of layers of gravel, sand, and a mixture of sand and organic topsoil over a tile drainage system. (See Sketch 1 and Sketch 2).

Sketch 2



E. Construction - 4" tile should be laid in trenches cut in the existing ground surface using a pattern such as that in Sketch 1. At no point should water be farther than 10 ft. from the nearest drain. The tile should be covered by a 6" layer of gravel. The gravel should be covered by a 6" layer of sand and the sand by an 12" layer of topsoil, sand, and organic matter mixed in varying proportions according to the drainage properties of the available materials. The Soil

Station No. 17 (continued)

Conservation Service can assist in determining the correct formula. Each layer should be packed as it is formed. The soil should be fumigated with metbyl bromide to kill weed seeds and nematodes before the green is seeded or sprigged.

F. Grasses - grasses are of two types, those which can be seeded and those which must be sprigged. Suggested varieties include Penncross bentgrass (which can be seeded) in the western part of N. C. and Tiftdwarf (must be sprigged) in the eastern part of N. C. Grasses which die back to the roots each fall may be alternated with ryegrass to keep greens green year round.

G. Maintenance - golf greens require a good deal of maintenance year round.

1. Mowing - one to six times weekly.
2. Aerifying - one to three times yearly preferably in conjunction with a turf slicing operation.
3. Watering - during dry periods.
4. Spraying - with fungicides such as Thiram, Tersan, Captan, or Iron as a treatment or preventative - with insecticides for such pests as Japanese beetles - with herbicides for weeds.
5. Fertilizing - a regular program of fertilization must be followed using varying kinds and amounts of fertilizer depending upon the soil

III. RATIONALE: - by constructing and maintaining a golf green students will gain skills in the following areas:

a. applying chemicals such as fungicides, insecticides, herbicides, and fertilizers.
b. determining amounts of chemicals, and water needed.
c. operating equipment used in turf management.
d. making tests and analyzing results to determine needed treatments.

These skills can be used in greenskeeping or any other agriculture field which requires a working knowledge of turf management or the component principles.

IV. REQUIREMENTS: All the following will be needed but some items can usually be borrowed.

a. land
b. tile
c. gravel
d. sand
e. topsoil
f. sawdust, peat moss, or other organic matter
g. polyethylene, cannisters of methyl bromide, the necessary applicators
h. hoses, sprinklers
i. hand tools such as rakes, shovels
j. reel type mower
k. soil aerator
l. spraying equipment

Station No. 17 (continued)

m. grass seed or sprigs
n. fertilizers and other chemicals

V. RESOURCES: Green construction should not be attempted without consulting local resource personnel such as golf pros and green superintendents, agriculture extension agents, soil conservation personnel, and any others actively engaged in turf or soil management.

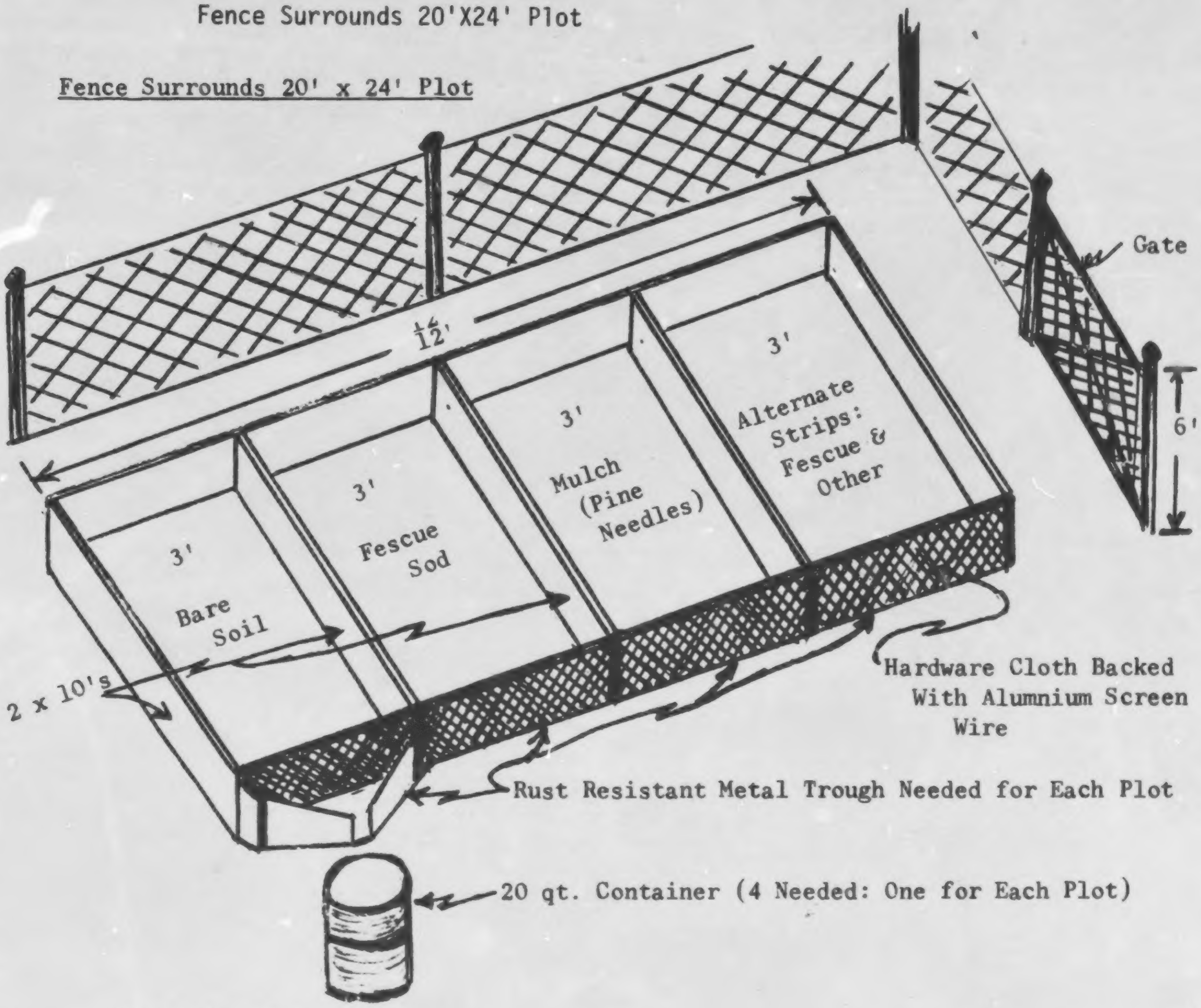
a. United States Golf Association - address available from local pro-publication on golf course construction.
b. Dr's William Gilbert and Carl Blake, NCSU, Turf Management.
c. Porter Bros. Inc., 1005 E. Dixon Blvd., Shelby, N. C. 28150 704-482-3424, turf care equipment and products.
d. Any good turf or soil management text.

STATION NO. 18

I. **EROSION TEST PLOT:**

II. **DESCRIPTION:** A plot of land having a 2-10% slope approximately 20' wide and 24' long divided into four 3X6 ft. sections using 2X10's for the divisions. Twenty quart containers are used to collect the run-off from each of the sections. (It is desirable to fence this plot if possible with 6' welded wire.)

Fence Surrounds 20'X24' Plot


Fence Surrounds 20' x 24' Plot
14
12'
Gate
6'
3'
Bare Soil
3'
Fescue Sod
3'
Mulch (Pine Needles)
3'
Alternate Strips: Fescue & Other
2 x 10's
Hardware Cloth Backed With Alumnium Screen Wire
Rust Resistant Metal Trough Needed for Each Plot
20 qt. Container (4 Needed: One for Each Plot)

III. **RATIONALE:**

This unit is designed to provide individuals with the opportunity to measure observe and measure the amount of water run-off and soil loss from different types of ground covers after an established amount of precipitation has been determined.

IV. **REQUIREMENTS:**

Station No. 18 (continued)

A sloping plot of land consisting of approximately 480 square feet, one rain gange, four 20 quart containers, 12 square feet of screen wire, 12 square feet of 1/4 inch hardware cloth, 48 feet of treated 2X10's, 24 square feet of rust resistant sheet metal and ground covers of your choice. (Should a fence be necessary 11 eight foot posts and 88 ft of wire fencing are needed. A four foot gate should be provided.)

V. RESOURCES:

1. Soil and Water Activities for Boy Scouts, U.S.D.A., Soil Conservation Service, PA-348.
2. Conservation for Camp and Classroom, Bale, Burgess Publishing Company, 426 South 6th Street, Minneapolis 15, Minnesota.
3. Soil Science in the Southeast, Welsh, The University of North Carolina Press, Chapel Hill, N. C.
4. District Soil Conservationist.
5. Our Natural Resources, Kircher, The Interstate, Danville, Virginia.

STATION NO. 19

I. SEWAGE DISPOSAL SYSTEMS:

II. DESCRIPTION: Show cross section of drain line and septic tank and show distribution box. (See Bulletion #519 State Board Health for drawing).

III. RATIONALE:

A. To show the importance of properly designed sewage systems with special emphasis on the following:

1. Location
2. Grade
3. Type of soil

B. To make the student aware of the importance of properly treated sewage with special regard to the Ecology.

1. Prevent contamination of drinking water.
2. Prevent the contamination of waters used for shellfish - breeding grounds or recreational purposes.
3. Prevent a nuisance due to odors or unsightly appearance.

C. To expose students to occupational opportunities.

1. Public health sanitarians
2. Municipal sanitarians
3. Installing or repairing sewage systems
4. Septic tank manufacturing

D. To familiarize students with the operation of the school sewage system.

IV. REQUIREMENTS:

A. Land - minimum amount to show cross section of septic tank and drain field, should be a minimum of 50' x 50'.

B. Equipment:

1. Septic tank
2. Distribution box
3. 50, 4" drain tile
4. 10' tar paper
5. Bag of cement
6. 1 yard of clean stone
7. 1 terra cotta septic tank T
8. 1, 2' section of 4" terra cotta
9. 200 linear feet of chain link fence

C. FFA AND SOE

Station No. 19 (continued)

1. Students would be encouraged to include sanitary sewage disposal in their home improvement proficiency award.
2. Students could be encouraged to work with firms directly related to sewage systems.
3. A study of this unit would benefit the student in the FFA Land Judging.
4. This could help the student in the Outdoor Recreation Proficiency Award.

D. Time for Development: Could be easily developed by the students in less than one year.

V. RESOURCES:

1. Bulletin #519, State Board of Health, Raleigh, N. C.
2. Local County Health Department for local requirements and ordinances.

STATION NO. 20

I. CAMP GROUNDS:

II. DESCRIPTION: A plot of land that will provide 12 to 15 tent sites for one class for overnight camping. One or two sites for "wheel" campers.

III. RATIONALE:

A. Provide camping facilities and experience for students.

B. To develop an appreciation of camp development and management.

C. Provide leadership and work opportunities for Ag students in working with youth groups.

D. Time - one year - continuing.

IV. REQUIREMENTS:

A. Land and site: Fairly open spot, elevated high enough to avoid early morning fogs, gently sloping land, soil of type that will absorb water, sheltered against prevailing winds, exposed to early morning sun, water suitable for drinking and bathing within a reasonable distance, available firewood, privacy, and game area.

B. Equipment: Tents (types) outdoor grill, toilet, benches, picnic table, axes, mattocks, chain saw, garbage cans, adriondike (shelter), shovels, lawn mower, tractor, and blade.

C. Check with local authorities on regulations.

V. RESOURCES:

1. "Boy Scout Handbook".
2. "The Golden Book of Camping and Camp Crafts", Golden Press, New York, most book stores.
3. "Camping and Trailering Guide", The Complete Magazine of Family Outdoor Fun, Rajo Publications, Inc., 319 Miller Avenue, Mill Valley, California 94941.
4. "Rural Recreation for Profit", The Interstate Printers and Publishers, Inc., Danville, Illinois.

STATION NO. 21

I. GUN SAFETY TRAINING RANGE:

II. DESCRIPTION: Single trap station and an obstacle course with fence, gate, foot log, and gully or ditch. Hunter safety activity trail consisting of gate, foot log, ditch or gully and an area with a single trap for throwing skeet.

III. RATIONALE:

A. To demonstrate safe gun handling.

B. To show capabilities of guns.

1. Shotgun gauges, rifle and handgun calibers.
2. Gun actions.
3. Different chokes.
4. Effective ranges.
5. Danger ranges.
6. Types of ammunition.

C. Proper gun fit.

D. To demonstrate care and maintenance of guns.

E. To practice marksmanship.

F. To appreciate pleasures from using guns.

1. Hunting.
2. Target shooting.
3. Gun collecting.

G. To acquaint students with occupational opportunities involving gun use.

1. Sporting goods salesman.
2. Skeet and trap operator.
3. Hunting guide.
4. Gunsmith.
5. Gun safety demonstrator.
6. Representative fo ammo or gun manufacturer.

IV. REQUIREMENTS:

A. Legal aspects - clear through principal and local superintendent.

B. Land - minimum size 150 ft. by 150 ft. with protective zone in background.

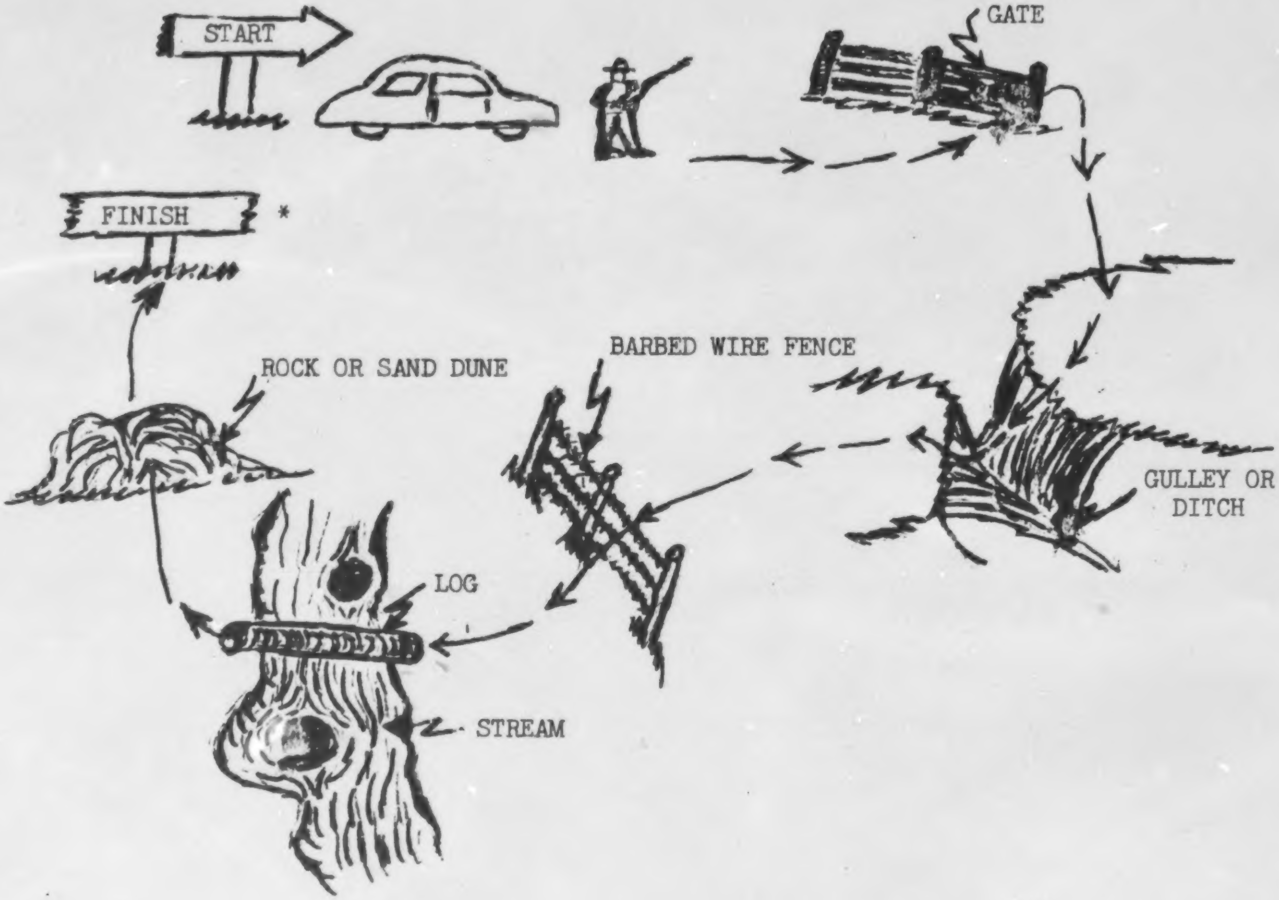
C. Equipment:

1. Portable clay target trap.
2. Clay targets.

Station No. 21 (continued)

3. Shotguns, rifles and handguns representing the different gun actions.
4. Ammunition.
5. Ammunition Board.

D. Suggested Hunter Safety Activity Trail:


START
GATE
FINISH
*
BARBED WIRE FENCE
ROCK OR SAND DUNE
GULLEY OR DITCH
LOG
STREAM

*NOTE: 1. Other obstacles may be added.

2. For other details: See: North Carolina Hunter Safety Manual

V. FFA and SOE:

A. Exploratory work experience suggestions.

1. Visit sporting goods department.
2. Visit skeet and trap ranges.

Station No. 21 (continued)

B. FFA Projects

1. FFA sponsored turkey sheet.
2. FFA Skeet contest.
3. Outdoor Recreation Proficiency Award.

VI. RESOURCES:

A. National Rifles Association

B. Stoegers Gun Digest

C. Shooters Bible

D. Wildlife Resources Commission

E. N. C. Hunter

F. Gun and ammunition manufacturers

*1. Browning Arms Co., Morgan, Utah 84050
*2. Remington Arms Co., Inc., Bridgeport, Connecticut 06602
*3. Winchester, Western Div., Olin Corp., 275 Winchester Ave., New Haven, Connecticut.
*4. Ithaca Gun Company, Inc., Ithaca, New York, 14850
*5. Harrington and Richardson, Worchester, Massachusetts
*6. The Marlin Firearms Company, 100 Kenna Drive, North Haven, Conn. 06473
*7. Savage Arms, Westfield, Massachusetts 01085
8. Federal
9. Mossberg
10. High Standard

*Materials known to be useful.

STATION NO. 22

I. RIFLE RANGE

II. DESCRIPTION: .22 cal. rifle range with minimum at 1000" with adequate safety areas and backstop.

III. RATIONALE:

- A. Safe gun handling:
- B. Capabilities of the .22 rifle.
  1. Rifle actions.
  2. Effective range.
  3. Danger range.
  4. Types of ammunition.
- C. Proper gun fit.
- D. Care and maintenance of rifles.
- E. Marksmanship.
- F. Pleasures from rifle shooting.
  1. Target shooting
  2. Hunting
  3. Gun collecting
- G. Occupational Opportunities.
  1. Sporting goods salesman.
  2. Rifle range operator.
  3. Rifle shooting instructor.
  4. Gunsmith.
  5. Hunting guides (very limited in N. C.).

IV. REQUIREMENTS:

- A. Legal aspects.
  1. Clear through principal and local superintendent.
  2. Work with Wildlife protector and gun safety officer.
- B. Land
  1. Minimum size - 25 feet wide and 100 feet deep.
  2. Backstop - dirt mound 10 feet high.
  3. Shooting stations for shootin- in the following positions:

Station No. 22 (continued)

a. Bench rest
b. Prone
c. Kneeling
d. Standing
e. Sitting

4. Target rack.

5. .22 Rifles representing the four different actions.

V. FFA AND SOE

A. Exploratory work experience suggestions.

1. Visit sporting goods department.
2. Visit rifle range.

B. Applicable to the Outdoor Recreation Proficiency Award.

C. Chapter Safety Award.

VI. RESOURCES:

A. National Rifle Association.

B. Stoegers Gun Digest.

C. Shooters Bible.

D. Wildlife Resources Commission.

E. Gun and Ammunition manufacturers.

1. Browning Arms Co., Morgan, Utah 84050.
2. Remington Arms Col, Inc., Bridgeport, Connecticut 06602.
3. Winchester, Western Division, Olin Corp., 275 Winchester Ave., New Haven, Connecticut.
4. Ithaca Gun Company, Inc., Ithaca, New York 14850.
5. Harrington and Richardson, Worchester, Massachusetts.
6. The Marlin Firearms Co., 100 Kenna Drive, North Haven, Connecticut 06473.
7. Savage Arms, Westfield, Massachusetts 01085.
8. Federal.
9. Mossberg Arms.
10. High Standard Arms.

STATION NO. 23

I. ROCK COLLECTION

II. DESCRIPTION:

A. Concrete form with Rocks imbedded and identified.

B. Located on Nature Trail if possible.

III. RATIONALE:

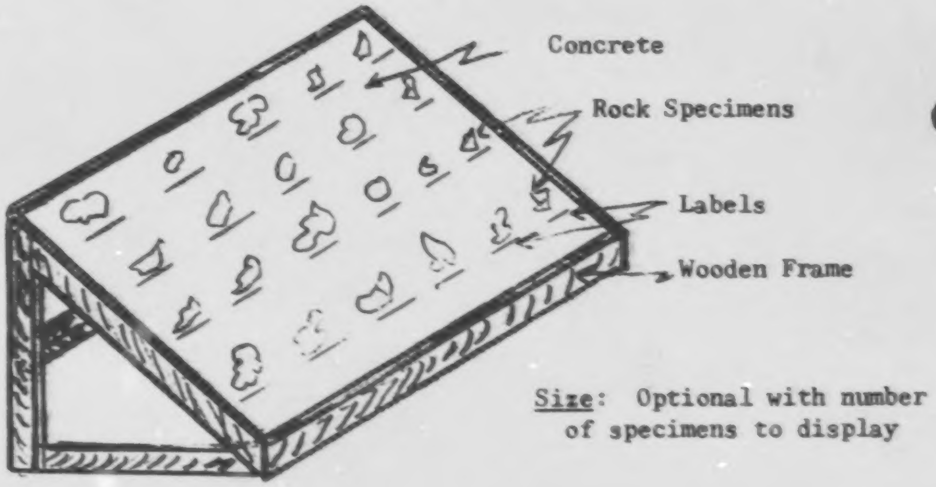
A. This unit is designed to familiarize individuals with types of rocks common to the area and to North Carolina.

B. Should be applicable to the different sciences and agricultural programs, especially in the study of soils and land judging.

IV. REQUIREMENTS:

A. Rock specimens.

B. Facility for mounting specimens permnantly. (See sketch below)


Concrete
Rock Specimens
Labels
Wooden Frame
Size: Optional with number of specimens to display

V. RESOURCES:

A. Local Soil Conservation Service

B. Local geologist or local college or university geology dept.

C. Local "rock hound".

D. Book references

1. Zim's Golden Nature Guide
2. Physical, Geology by Leet and Judson
3. Historical Geology by Dunbar and Waage

STATION NO. 24

I. TREE GROWTH DEMONSTRATION:

II. DESCRIPTION:

A. An existing forest area.

B. Establish a new forest.

III. RATIONALE:

A. Relate tree growth in different forest situations.

B. Relate tree growth to different types of management practices.

IV. REQUIREMENTS:

A. A forestry plot on school ground or on adjoining lands.

B. Cross sections of different tree species illustrating growth and age.

   1. Cross section of log.
   2. Cross section of stump.

(See Diagram Below) You may wish to check the tree age and mark on layers the point in history when this layer was being formed: ie,The American Revolution, WWI, WWII, etc.

C. Assortment of forestry tools.

V. FFA AND SDE:

A. Forestry contests.

B. Proficiency award in forest management.

C. Soil and Water Proficiency Award.

VI. RESOURCES:

A. County forester.

B. Local saw mill.

C. Pulp and paper company.

D. Forestry textbook.

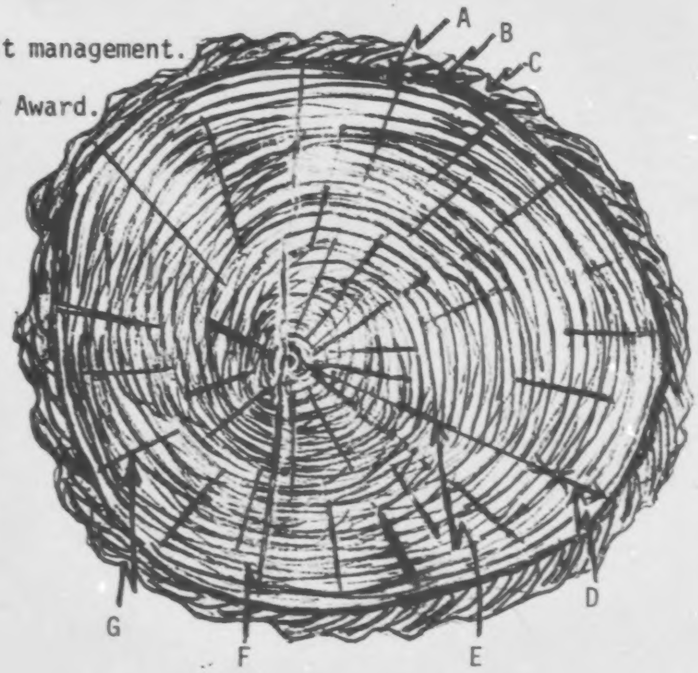


DIAGRAM:

A ... Cambium
B ... Inner Bark
C ... Outer Bark
D ... Sapwood
E ... Heartwood
F ... Pith
G ... Pith Rays

STATION NO. 25

I. **WILDLIFE HOUSES:**

II. **DESCRIPTION:**

A. Bird houses

B. Squirrel houses

C. Wood duck house

III. **RATIONALE:**

This unit is designed to familiarize individuals with types of houses for different wildlife species and acquaint them with the construction and materials used in the construction of these houses.

A. Acquaint students and general public with types of houses for the different species.

B. Acquaint individuals with materials useful in construction of the various houses.

IV. **REQUIREMENTS:**

A. Bird houses for the different birds that will nest in houses and construction materials.

B. Squirrel boxes and construction materials.

C. Wood duck boxes and construction materials.

D. Nature trail or applicable school grounds.

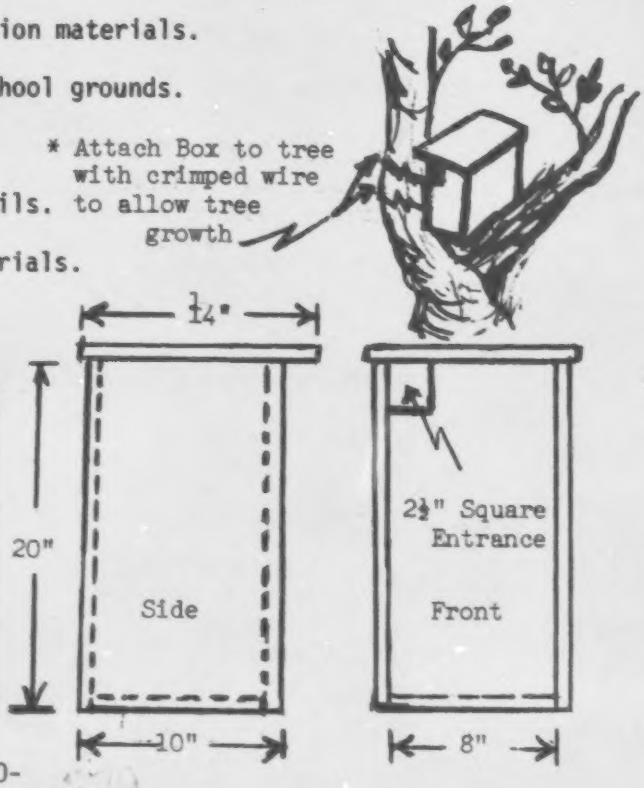
E. Corner of pond.

F. Trees on campus or nature trails.

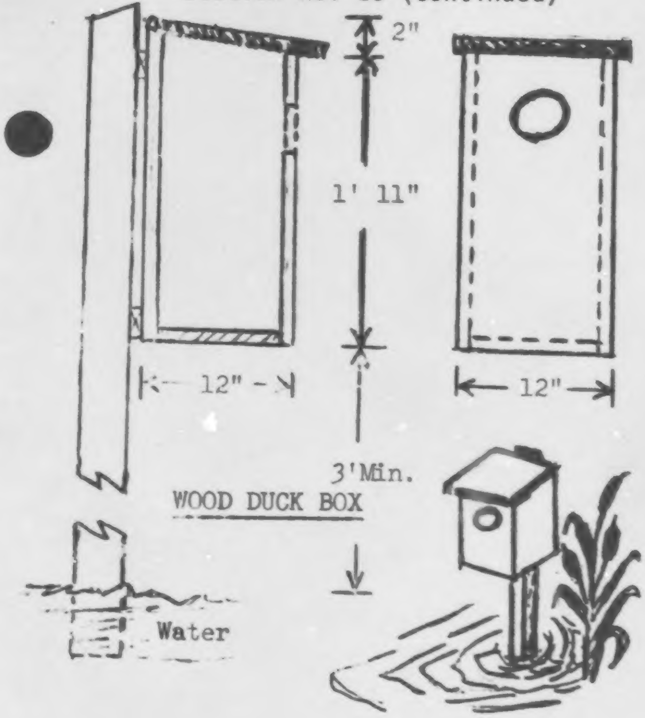
G. FFA and SOE Construction materials.

SQUIRREL BOX

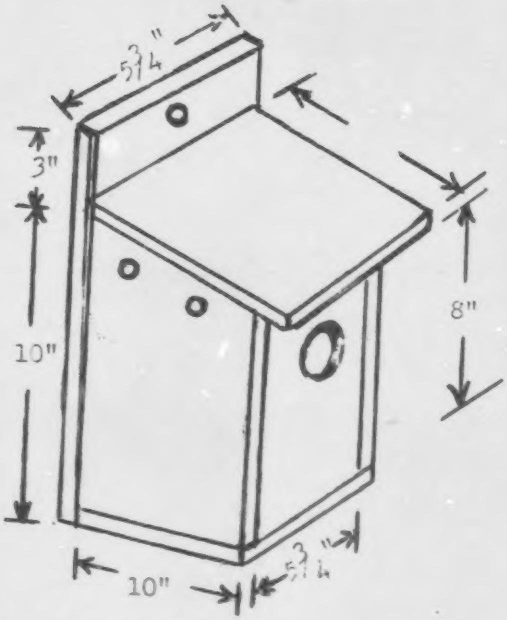
MATERIALS LIST	
Front	8" x 20"
Back	8" x 20"
Sides	10" x 20"
Top	12" x 14"
Bottom	8" x 8"



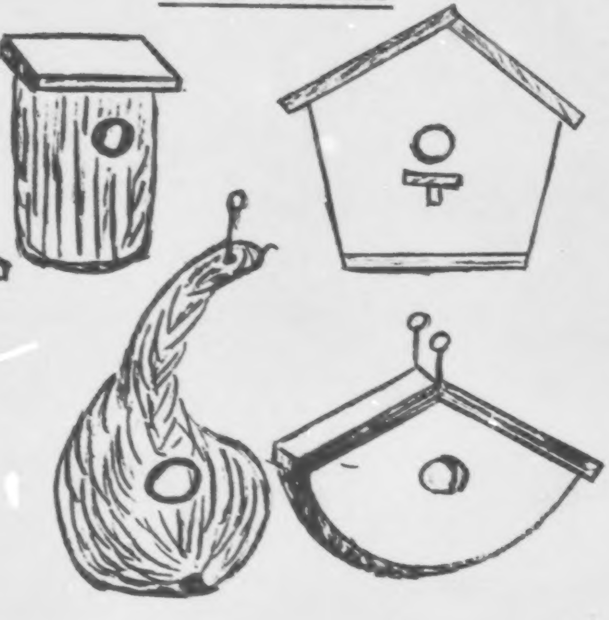
Station No. 25 (continued)

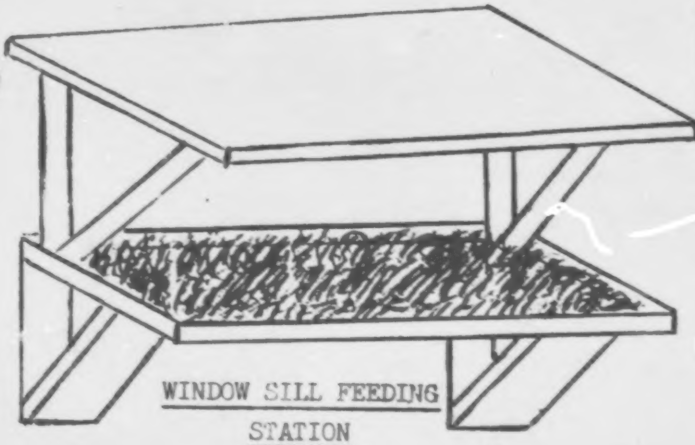


WOOD DUCK BOX



HOUSES FOR BIRDS





WINDOW SILL FEEDING STATION

V. FFA AND SOE:

A. Applicable to fish and wildlife management award.

B. Project for BOAC program for the community.

C. Possible fund raising project.

D. An excellent hobby that can develop into a small part-time business.

VI. RESOURCES:

A. Bird Furniture, N. C. Wildlife Resjurces Commission.

B. Tarheel Wildlife on the Farm, N. C. Wildlife Resources Commission.

STATION NO. 26

I. GAME FEEDING PLOT:

II. DESCRIPTION:

Areas of land which can be seeded with appropriate wildlife food and cover crop and clearly labeled as to the type of cover used. Areas as small as 1/8 acre can serve a two-fold purpose by supplying individuals with an opportunity to study the various types of foods used by wildlife.

III. RATIONALE:

This unit is designed to familiarize the individual with different types of food and cover used to attract and hold different wildlife species in an area. Students will be provided an opportunity in establishing and maintaining the game breeding plots.

IV. REQUIREMENTS:

A. Land - Almost any wasted or unused area can be suitable for use as a game feeding plot, thus eliminating the need for securing any special lands. Roadside banks, eroded gullies power line right-of-way, or idle farmlands may be planted with the appropriate seed or seedlings to produce a game feeding plot display.

B. Equipment:

1. Tractor with bog or tiller.
2. Hand tools (shovels, rakes, etc.)
3. Fertilizer and lime.
4. Seeds (available free from the N. C. Dept. of Wildlife).
5. Signs or labels.
6. Mowers.

C. Time for Development: Complete development in 1-3 years, depending on types of seed used.

V. RESOURCES:

A. Local Soil Conservationist.

B. Tarheel Wildlife on the Farm, N.C. Wildlife Resources Comm., Raleigh, N.C.

C. Farmers Bulletin #2035, "Making Land Produce Wildlife," U. S. Dept. of Agriculture, Superintendent of Documents, Washington, D. C.

D. Our Wildlife Neighbors, N.C. Wildlife Resources Commission, Raleigh, N.C.

E. Principles of Game Management, Madson, John and Kozichy, Olin Mathieson Chemical Corp., East Alton, Illinois 1962.

Station No. 26 (continued)

VI. COMMENTS:

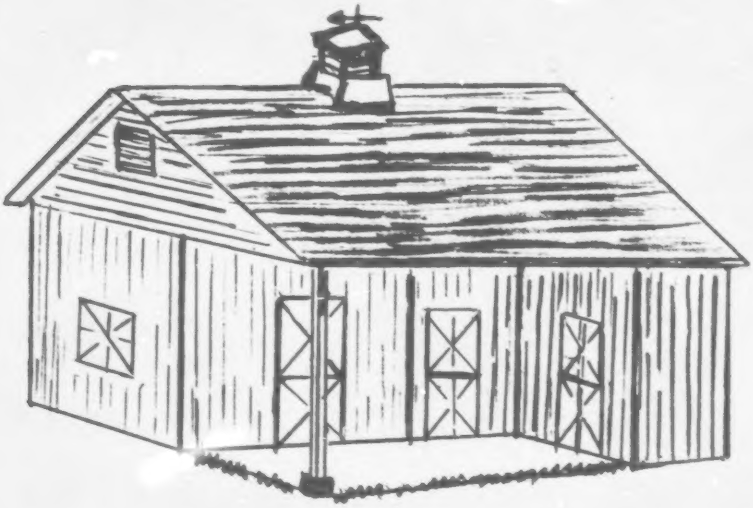
The development of a game feeding plot display can be interrelated with many other areas of study such as Soil and Water Management Contests and proficiency awards, wildlife management, and land judging contest. The development of game feeding plot displays will allow students to gain the experience needed to establish their own game feeding plots on their farms or on lands unsuitable for farming.

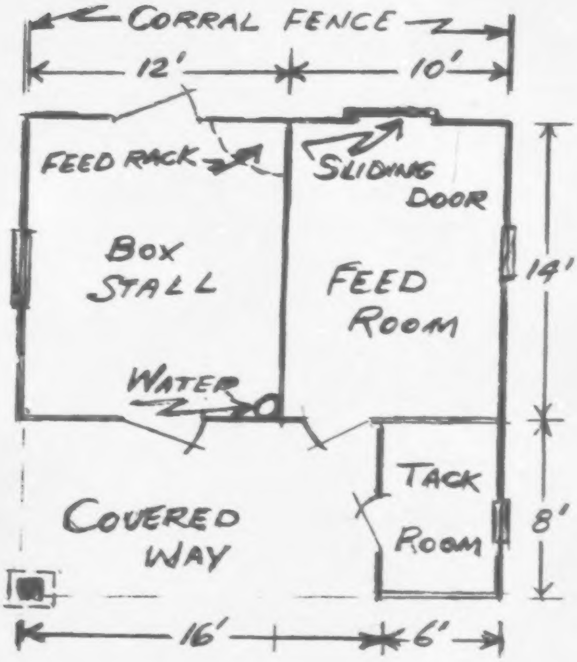
STATION NO. 27

I. HORSES, RIDING STABLES AND RIDING RING:

II. DESCRIPTION:

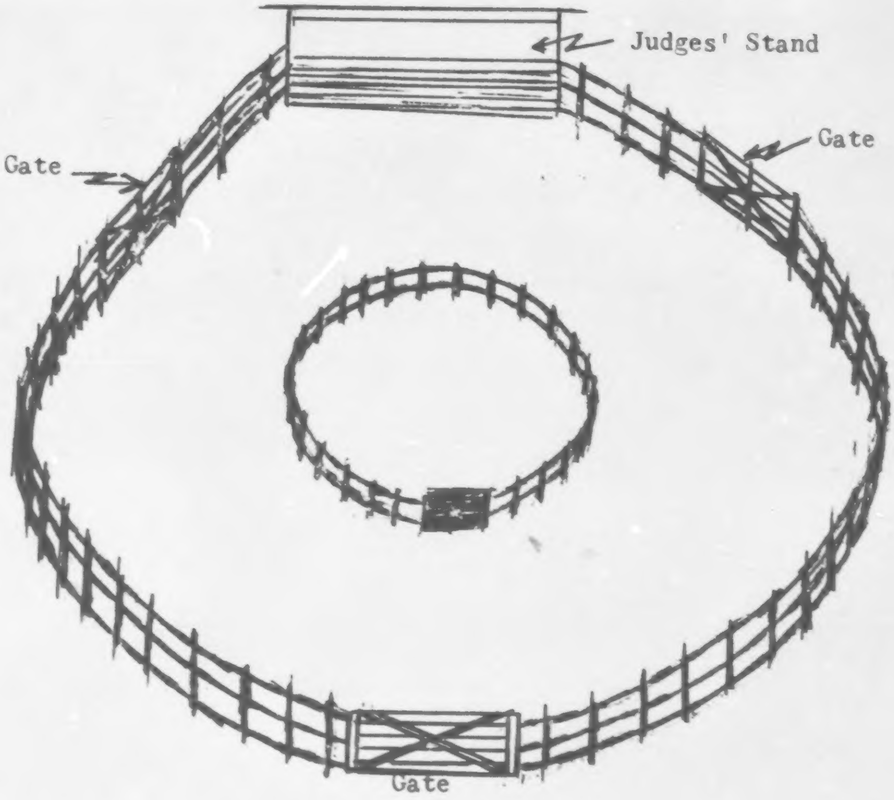
A minimal facility of one typical stable plus adequate storage area. (See below). Also a show ring with judges stand. A riding trail layed out with typical stop or interest stations identified.




CORRAL FENCE
12'
10'
FEED RACK
SLIDING DOOR
BOX STALL
FEED ROOM
14'
WATER
TACK ROOM
COVERED WAY
8'
16'
6'

STATION NO. 27 (continued)

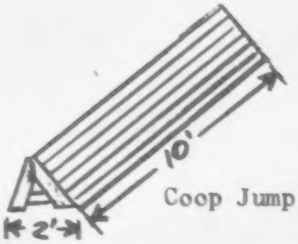
A Suggested Show Ring:


Judges' Stand
Gate
Gate
Gate

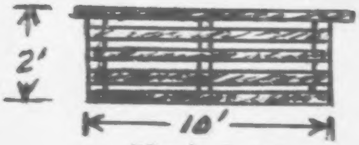
NOTE:

Size will vary with amount of ground available and amount of use that will be made of facility

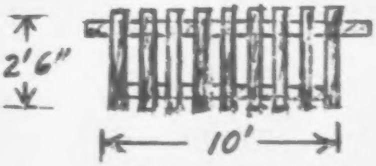
Jumping Obstacles:



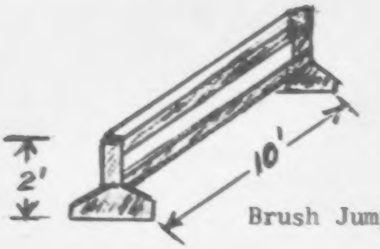
Coop Jump



Plank Jump



Picket Jump



Brush Jump

III. RATIONALE:

A. To familiarize students with scope of riding stables enterprise.

B. To familiarize students with kinds of horses and ponies kept in a riding stable and to help them develop skills involving horse husbandry.

C. To familiarize students with basic facilities needed for riding stable enterprise.

D. To familiarize students with basic equipment needed for riding stable enterprise.

E. To enable students to acquire managerial skills necessary to work in this enterprise area.

IV. REQUIREMENTS:

A. Construction typical stable and equipment storage area.

B. Construction of typical show ring.

C. Lay out of typical riding trail.

D. Availability of one or more horses or ponies.

E. Time for development: 3 years.

V. RESOURCES:

A. Ensminger, M. E., Horses & Horsemanship, The Interstate Printers, Danville, Illinois, 1969.

B. Ensminger, M. E., The Stockman Handbook, The Interstate Printers, Danville, Illinois, 1970.

C. Ensminger, M. E., Animal Science, The Interstate Printers, Danville, Illinois, 1969.

D. Smith-Partin-Champlin, Rural Recreation for Profit, The Interstate Printers, Danville, Illinois, 1968.

E. How To Become A Better Rider, Farman Horse Library, 1972 8701, N. 29th. Street, Omaha, Nebraska 68112.

F. Widmer, Jack, A Practical Guide For Horse Owners, Charles Sireburs Sons, New York 1956.

G. Ulmer-Jurgenson, Approved Practices In Raising and Handling Horses, The Interstate Printers, Danville, Illinois, 1974

STATION NO. 28

I. POISONOUS PLANTS DISPLAY:

II. DESCRIPTION:

A. Existing poisonous plants labeled on the nature trail.

B. Color slide series for teaching purposes (locally developed).

C. Plot of "cultivated" poisonous plants if desired.

D. Wall posters and/or pictures for classroom display.

III. RATIONALE:

A. For students and others to learn to identify poisonous plants in order that they may be aware of the danger and take the necessary precautions when involved in outdoor recreation or outdoor occupations.

B. To assist in creating interest in the FFA chapter safety contest.

IV. REQUIREMENTS:

A. Land - 100 square feet for plant plot if live plants are used.

B. Equipment:

1. Plastic gloves
2. First aid kit
3. Pruning shears
4. Sprayer for control
5. Chemical disinfectant for tools
6. Label maker (metal tape)
7. Plant drying press
8. Camera 35mm and slide film
9. Slide projector
10. Projection screen
11. Pictures or posters
12. Fence and posts

C. Facilities:

1. Existing land on the school campus and in the local community.
2. Display case for mounted plants.
3. Bulletin board.
4. Demonstration plot enclosed with fence for growing plants.

D. Time for Development: three years with continued maintenance.

V. RESOURCES:

1. Don't Eat the Daisies by Luther Partin.

2. National Safety Council.

Station No. 28 (continued)

3. Poisonous Plants, N. C. Extension Service.
4. N. C. Museum of Natural History, Raleigh, N. C. (Eugene Upchurch).
5. USDA, Washington, D. C.
6. "To Your Health" by Paul Metzger, M. D., Carolina Cooperator, May, 1971.
7. Boy Scout Handbook.

STATION NO. 29

I. CHEMICAL CONTROL PLOT:

II. DESCRIPTION - A small area of land to demonstrate the use and benefits of agricultural chemicals.

III. RATIONALE:

A. To demonstrate the effects of proper use of various insecticides, herbicides, fungacides, and fertilizer.

B. To develop an appreciation for the benefits and problems of using chemicals.

C. To provide students the necessary instruction and practice in the area of pesticide safety.

D. To introduce students to occupations related to the manufacturing, use, and sale of chemicals.

E. To demonstrate to students the opportunities of improving supervised practice programs through the correct use of various chemicals.

F. To stimulate interest in the FFA Chapter Safety Contest.

IV. REQUIREMENTS:

A. Land - 500 sq. feet of land plus greenhouse.

B. Equipment - sprayer, methyl bromide applicator, chemicals, fertilizer applicator, rubber gloves, respirator, rotarty tiller, polyethylene cover.

C. Facilities - land and greenhouse.

D. Time for development - one year with continuous updating.

V. REFERENCES:

1. N. C. Agricultural Chemicals Handbook, 1974, N. C. Extension Service, Raleigh, N. C.
2. Chemical Weed Control Information for North Carolina, 1972, Leaflet 174, N. C. Extension Service, Raleigh, N. C.
3. Insect Control for Vegetable Gardeners, N. C. Extension Service, Raleigh, N. C.
4. N. C. Fertilizer Handbook, N. C. Department of Agriculture, Raleigh, N.C.
5. N. C. Agricultural Workers Handbook, N. C. Extension Service, Raleigh, N.C.

BOOKS

1. Pond Life, Ford, Richard L.E., Morrison and Gibb Limited, London, England, (Could possibly be found in library. One copy recommended.)

2. Our Natural Resources, McNall and Kircher, The Interstate Printers and Publishers, Inc., Danville, Illinois. (This book deals with maintaining our natural resources and our total environment.)

3. Rural Recreation for Profit, Smith, Partain, and Champlin, The Interstate Printers and Publishers, Inc., Danville, Illinois. (This book will be valuable to people in planning, developing, managing and operating recreational enterprises.)

4. North Carolina Lands, Pomeroy and Yoho, The American Forestry Association, 917 17th Street, N. W., Washington, D. C. 20006. (The American Forestry Association traces the state, county, municipal, private, and federal ownership of forest lands in North Carolina with recommendations for future use.)

5. That We May Live, Whitten, D. Van Nostrand Company, Toronto, Canada. (Facts about the effects of pesticides on our national health are presented, their use, dangers, and contribution to our welfare. One copy recommended.)

6. From Sea to Shining Sea, Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402, $2.50. (The President's Council on Recreation and Natural Beauty and the Citizens Advisory Board on Recreation and Natural Beauty presents information on the urban and rural environment in the U. S. and agencies sharing responsibility for action. One copy recommended.)

7. The Outdoor Schoolroom for Outdoor Living, Vinal, Cohasset, Mass. (This book is available from library at N. C. State University, Raleigh, N. C. and possibly from other large libraries.)

8. How to Plan and Plant Your Own Property, Ireys, M. Barrows and Company, Inc., New York, New York. (A well illustrated book on the design and use of plant materials in landscaping homes and cottages. One copy recommended.)

9. The Ray Harm Nature Sketch Book, Harm, The World Publishing Co., 2231 West 110th Street, Cleveland, Ohio 44102. (This book contains pictures of birds, animals, and flowers with information about each. Recommended for biology and outdoor recreation and applied ecology. One copy.)

10. Basic Gardening Illustrated, Lane Books, Menlo Park, California, $2.95. (Self illustrated book on planning and remodeling landscape plans. One copy per student.)

11. Career Education in the Environment, U.S. Office of Education, Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402. (This book is designed to be used to explore environmental problems and solutions and to provide information on existing and emerging career opportunities.)

12. Guidelines to Planning, Developing, and Managing Rural Recreational Enterprises, Bulletin 301, Coop. Extension Service, V.P.I., Blacksburg, Virginia. (One copy recommended.)

Books (continued)

13. Conservation for Camp and Classroom, Bale, Burgess Publishing Col, 426 South 6th Street, Minneapolis 15, Minnesota. (This book is to serve as a guide to meaningful activities, demonstrations and activities that can be used by instructors. One copy.)

14. Techniques for Teaching Conservation Education, Brown and Jouser, Burgess Publishing Co., 426 South 6th. Street, Minneapolis 15, Minnesota. (One copy.)

15. Forests and Forestry, Anderson and Smith, The Interstate, 19-27 N. Jackson St., Danville Illinois. (Provides information on forestry management. One per student.)

16. NAPC Abstract Bulletin, U. S. Department of HEW, Public Health Service, Volume 1, No. 10, National Air Pollution Control Administration, 1033 Wade Avenue, Raleigh, N. C. 27605. (This bulletin has information pertaining to technical liberature recently acquired by National Air Pollution Control Adm. One copy.)

17. Nature Study for Conservation, Brainerd, The McMillan Company, New York, New York. (This book should help biology and agriculture students in studying nature so that they may decide on appropriate conservation practices. Three or four copies.)

18. Nature Recreation, Vinal, Dover Publications, Inc., 180 Varick St., New York 14, New York. (This book deals with nature recreation, trips, activities, trails, and suggested leadership experiences.)

19. Understanding Ecology, Billington Fredrick Warne and Co., New York, New York ($4.50)

20. Wild Flowers of N. C., Justice, Chapel Hill Press, Chapel Hill, N. C. ($7.95)

21. Weather, Lehr, Western Publ. Co., Racine, Wisc. ($1.50)

22. Our Soils and Their Mgt. Donahue, Interstate, Danville, Ill.

23. Turf Mgt. Handbook, Sprague, Interstate, Danville, Ill.

MAGAZINES AND BULLETINS

1. American Education Magazine, May, 1971, Article: Environmental Education Cannot Wait. HEW, Office of Education, Washington, D. C. (Librarian can subscribe for this free.)

2. Environmental Education, March, 1971, Department of Public Instruction, Raleigh, N.C. (Covers environment problems, sociocultural environmental and suggested environmental educational activities.) (Free)

3. Manual of Outdoor Interpretation, By: Joseph J. Shomon, National Audubon Society, Nature Centers Division, 1130 Fifth Avenue, New York, New York 10028, price $3.00. (Includes nature appreciation, national park system, forest, parks, outdoor labs, camps, underwater world and caves.)

4. Career Opportunities: Ecology, Conservation, and Environmental Control, J. G. Ferguson Publishing Co., Chicago Illinois. (Contents: Careers in outdoor recreation and applied ecology.) Price $6.95.

5. The American Rifleman Magazine, By: National Rifle Association of America. 1600 Rhode Island Ave.. N.W., Washington, D. C. 20036, Cost $7.50 per year.

6. Wildlife Magazine, By: North Carolina Wildlife Resource Commission, Raleigh, N. C. 27602. Cost $2.00 per year.

7. It's Your World, the grassroots conservation story, U.S. Department of Interior Conservation Yearbook #5, $2.00, Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.

8. The Third Wave .... America's New Conservation Man ... An Endangered Species? The Population Challenge ... What it Means to America, River of Life ... Water: The Environmental Challenge, Quest for Qualigy. (These five and the one listed in number 7 above are six publications from the Department of Interior at a total cost of $11 .. (Recommended 1 set per teacher).

9. Wildlife Conservation Programs of FFA, Minnesota Department of Education, Capital Square Building, St. Paul, Minnesota, 55101.

10. FFA Mallard Release Program, address same as number 9 above.

11. The Nature Program at Camp, Janet Nickelsburg, Burgess Publishing Co., 426 S. 6th. Street, Minneapolis 15, Minnesota. (Includes: nature crafts, camps, and basic camp training guide). Recommend 1 per teacher.

12. Camping and Trailering Guide Magazine, Rajo Publications Inc., 319 Miller Avenue, Mill Valley, California 94941. Cost $5.50 per year. (Recommend one copy per school.)

13. Deer Lake Lodge - Worksheets on Ecological Subjects. Environmental Education Center, 13 Veterans Dr., Oteen, N. C.

14. Developing On - Site Nature Trails, Environmental Education Center, 13 Veterans Dr., Oteen, N. C.

Magazines and Bulletins (continued)

15. Teaching Aids for Environmental Science, January, 1971, Science and Math Teaching Center, Michigan State University, East Lansing, Michigan. (Contents: Forestry, earth science, water, air pollution suppliers, weather and water testing equipment.

16. Publications of the National Audubon Society, National Audubon Society, Nature Center Planning Division, 1130 Fifth Avenue, New York, New York 10028. (Recommended for school library.)

17. North Carolina Wildlife Resources Commission Publications. Included Birds - 6 pub., Fish - 10 pub., Game Birds and Animals - 13 pub., Miscellaneous - 5 pub., Regulations - 9 pub., Raleigh, N. C. 27602. (See Bibliography in curriculum guide.)

18. Elementary Guide to the Mesic Hardwood Hammock Nature Trail, University of West Florida Campus, Pensacola, Florida. (Description of a nature trail established in Florida.)

19. The Edward Ball Nature Walks, A hardwood swamp By: Joe A. Edmisten, Gamma College, University of West Florida, Pensacola, Florida. (Description of a nature trail in a swampy area of Florida.)

20. Occupations in Environmental Control, ERIC Clearinghouse on Vocational and Technical Education, The Center for Vocational and Technical Education, Ohio State University, 1900 Kenny Road, Columbus, Ohio 43210. (One set per school).

21. Outdoor Classrooms on School Sites. A booklet illustrating the wide variety of outdoor learning stations. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402. Price $.25, Stock No. 0100-1458.

22. Teaching Soil and Water Conservation - A Classroom and Field Guide. A guide depicting experiemnts in soil and water conservation with interpretations of the results of the experiments. One copy for each student is recommended. This monthly magazine provides information on land and water conservation. It is useful to teachers and to students in grades 7 and above. Order by subscription from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. $2.00 per year.

23. An Outline for Teaching Conservation in Elementary Schools. Recommended for use with #3 above. Available from same source, same price.

24. Cooperative Education in Vocational Agriculture - Guide for Developing Courses in North Carolina Schools. Recommended for teachers of agriculture, principals, counselors, superintendents, local directors, agricultural businessmen, and others interested in adding the cooperative approach to the vocational agriculture program. Free of charge from the Division of Occupational Education, State Department of Public Instruction, Raleigh, N. C. July 1971.

25. Science Materials - Preparation and Exhibition for the Classroom. A valuable publication for use as a step-by-step guide to the preparation of materials for display. Recommended one per student. William C. Brown Company Publishers, 135 South Locust Street, Dubuque, Iowa 52003.

Magazines and Bulletins (continued)

26. Science Materials - Preparation and Exhibition for the Classroom. A valuable publication for use as a step-by-step guide to the preparation of materials for display. Recommended one per student. William C. Brown Company Publishers, 135 South Locust Street, Dubuque, Iowa 52003.

27. Tree Identification Manual for 4-H Members. Published by The N. C. Agricultural Extension Service, Raleigh, N. C.

28. Careers in Wildlife Conservation. A description of the duties, training requirements and salaries associated with the various careers. Conservation Dept., Olin Mathieson Chemical Corp., East Alton, Illinois.

29. Nature Trails, Extension Bulletin # 368, Agricultural Extension Service, University of Minnesota, St. Paul, Minn. 55101

30. Weather, A price list of publications, stock # 9000-4857, Supt. of Documents, Washington, D. C. 20402.

31. LaMotte Catalog, LaMotte Chemical Co., Chestertown, Md. 21620.

32. Land Judging In N. C., N. C. Extension Service Publication.

33. Boy Scouts of America Archery Merit Badge Manual.

34. NASCO Catalog, Ft. Atkinson, Wisc. 53538.

35. Herters Catalog, Herter's Inc. Mitchell, S. D. 57301.

36. Graves - Humphies Catalog, Roanoke, Va.

37. Ben Meadows Co. Catalog, Atlanta, Ga. 30306, 553 Amstedam Ave, N.E.

38. Forestry Suppliers Catalog, 205 W. Rankin St., Jackson, Miss. 39204.

39. Broadhead - Garrett Co. Catalog, 1213 Riverside Dr., Macon, Ga. 31201.

40. Fur, Fish and Game Magazine, Harding Pub. Co. 2878 E. Main St., Columbus, Ohio 43209 ($4.00 per year)

41. Environmental Educ. Series, (Land Use, Noise, Plants, Water, Animals, Agri. Chemicals and Radiation, Air, Understanding the Environment) State of Washington Coordinating Council for Occupational Education 216 Old Capital Building, Olumpia, Washington, 98504. ($8.00)

SLIDES

Slides Available From:

Technical Audiovisual Branch
Office of Technical Information and Publications
Technical Center
Research Triangle Park
North Carolina 27709

"Air Pollution Effects on Vegetation"

Produced and Distributed by:

California State Polytechnic College
Vocational Education Productions
San Luis Obispo, California 93401

Slides Available From:

Library at Visual Aids Department
N. C. State University
Box 5037
Raleigh, N. C. 27607

"Keep North Carolina Livable"

22 minutes, 30 sec. 7 1/2 IPS.

A narrated slide set designed to give a balanced picture of the major causes and effects of pollution in North Carolina. The presentation also includes practical examples of how Tar Heel citizens are working to reduce pollution and clean up their environment.

FILMS

Available From:

National Audiovisual Center
Washington, D. C. 20409

a. "Air Pollution and Plant Life"

Available From:

Library at Visual Aids Department
N.C. State University
Box 5037
Raleigh, N. C. 27607

a. "The Choice is Yours"

13 1/2 min. Color

b. "Air Pollution and Plant Life"

19 min. Color

Available From:

Wildlife Resources Commission
Box 2919
Raleigh, N. C. 27602

a. "Conservation and Balance in Nature"

b. "Estuarine Heritage"

(See Appendix C Under Ecology in your guide Outdoor Recreation and Applied Ecology)

c. "Cry of the Marsh"

(See guide - Pollution and Habitat Destruction)

d. "George Washington's River"

(See guide - Pollution and Habitat Destruction)

e. "The Persistent Seed"

(See guide - Pollution and Habitat Destruction)

f. "Islands of Green"

(See guide - Nature Study)

Films (continued)

Request Catalog From:

Modern Talking Picture Service, 503 N. College St., Charlotte, N. C. 28202
and 2323 New Hyde Park Rd., New Hyde Park, N.Y. 11040

Department of Interior, Washington, D. C.

Miscellaneous:

1. Membership in: Outdoor Life Book Club.
2. Agencies for Resource People

List of Resource Agencies: Raleigh, N. C. 27611

Travel and Promotion Office (industrial, tourists, and community resource office)

(Administration Building)

North Carolina State Parks (Administration Building)

Forestry Resources Office (Administration Building)

Water and Air Resources Office (Old Health Building)

Wildlife Resources Commission (Albemarle Building)

State Museum (Agriculture Building)

State Department of Agriculture (Agriculture Building)

Recreation Resources Office (436 N. Harrington Street)

Archives and History Building (Jones Street)

Earth Resources Office (112 W. Lane St.)

Division of Occupational Education (5th. Floor Education Building)

State Board of Health

Also:

Local Health Department

Soil Conservation Service

Local Game Protector

LOcal Wildlife Club